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THE

# DENTAL COSMOS:

A

## MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDITED BY

EDWARD C. KIRK, D.D.S.

Observe, Compare, Reflect, Record.

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## TO VOLUME XL.

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# CONTENTS OF VOLUME XL.

## ORIGINAL COMMUNICATIONS.

Abscess upon Teeth with Living Pulps .......... 621
Abstract of the Report of the Committee on Foreign Relations of the National Association of Dental Faculties...... 822
Aluminum Crowns .......... 550
Architecture (The) of the Human Teeth .......... 605
Buccal Manifestations of Syphilis .......... 436
Caries of an Unerupted Tooth.. 816
Cataphoresis (Electrolysis)..... 615
Combination of an Entire Under Set of Artificial Teeth, Lip, and Beard.......... 1003
Comments on Dr. Foster's Paper on Cocain Poisoning.......... 923
Comparison (A), with Suggestions .......... 1005
Constricted Vaults.......... 914
Contagious Phagedenic Gingivitis .......... 456
Contour Slip Matrices.......... 452
Degeneracy, in its Relation to Deformities of the Jaws and Irregularities of the Teeth.... 734
Dental Anomaly (A)..........35, 281
Dental Education from a College Standpoint .......... 337
Dentistry or Stomatology....... 265
Dr. Black's Conclusions Reviewed Again.......... 440
Double Resection of the Inferior Maxilla for Protruding Lower Jaw .......... 552
Double Resection of the Lower Maxilla .......... 635
Few Considerations (A) in Filling Teeth.........723, 811, 907, 987
Formaldehyd as a Practical Disinfectant for Instruments..... 537
Formalin .......... 344
Fractures of the Maxillæ.......... 188
Gold in Amalgam.......... 17
Gomphiasis .......... 924
Half-Cap Crown (The).......... 981
Histology (The) of Cementum.. 697
Human Teeth from a Comparative Standpoint.......... 95, 253
Hypodermic Local Anesthesia as Practiced in Europe.......... 347
Immediate and Remote Causes of the Malformation of the Dental Arch.......... 270
Importance (The) of Establishing a Technic as well as Literary Standard for College Entrance .......... 818
Innervation (The) of the Tooth-Pulp .......... 797
Is Dental Caries accompanied by Inflammatory Action?........ 351
Manifestations of Syphilis in the Mouth .......... 431
Matrix Contouring.......... 355
Method (A) of Inserting Gold Fillings with the Use of Hand Burnishers, as Practiced Exclusively for Twenty Years, 169, 276, 421
New Method (A) for an All-Porcelain Banded Crown.....1009
Nitrous Oxid .......... 18
On Structural Changes in Human Enamel; with Special Reference to Clinical Observations on Hard and Soft Enamel .......... 505
One of the Present Needs of the Profession—A History........ 20
Oral Hygiene and Mouth-Washes .......... 628
Painless Dentistry.......... 14
Physiology and Dynamics of Tooth-Movement .......... 995
Porcelain Enamel Inlays........ 633
Prominent Causes (The) of Failure in the Use of Electricity in Dentistry .......... 9
Pyorrhea Alveolaris, with Some Notes from the Practice of the Author .......... 543
Reciprocating Tooth-Movement: A Sequel.......... 196
Removable-Facing Crown- and Bridge-Work .......... 920
Scientific Criticism and the New York Institute of Stomatology 85
Studies of the Maxillary Bones, No. 2.......... 881
Surgical Anatomy of Alveolo-Dental Abscess Opening into the Anterior Nares..........1011
Surgical Treatment of Alveolar Abscess .......... 454
System (A) to Assist in the Identification of Criminals and Others by Means of the Teeth 113
Toxic Effect (The) of Cocain, induced through Cataphoresis, applied to a Pulp Preparatory to its Removal.......... 739
Varieties of Dental Calculi...... 1
Visual Defects of Dentists...... 27
"What is It?".......... 547

## CORRESPONDENCE.

Articulation and Occlusion..... 119
Correction .................... 925
Dental Law of New Jersey (The) .................... 638
Dentists in the Army and Navy 558
"Faculties *vs.* Examiners".. 116, 285
Gold and Cement Fillings...... 743
Mr. Charles Tomes *in re* Gray's "Anatomy" .................. 831
National Dental Association, Southern Branch..........557, 641
Spelling (The) of Scientific Terms ...................... 36

## PAPERS IN SOCIETY PROCEEDINGS.

Alveolar Pyorrhea.............. 304
Bleaching with Cataphoresis.... 383
Clinic (A) on a Fusible Alloy.. 371
Coagulation Theory (The)...... 286
Compatibility (The) of Different Filling-Materials with Tooth-Structure .................... 60
Consideration (A) of the Objections Offered by Physicians to Amalgam Fillings............ 207
Dental Bridge-Work, Fixed and Removable .................. 834
Dental Laws and What They have Accomplished........... 568
Dental Matrices................ 223
Dentist's Posture (The) at the Operating Chair; Its Influence upon the Health of the Body.. 846
Expression in Crown- and Bridge-Work ................ 945
Extracting Teeth during Acute Pericementitis ............... 47
Failures in Operative Dentistry. 927
Few Incidents (A) and Their Lessons .................... 576
Hydrogen Dioxid in the Treatment of Diseases of the Mouth .....................1038
Leucoplakia ................... 836
Management of Pulpless Teeth.. 952
Method (A) of Handling Alveolar Pyorrhea................. 757
Method of Teaching Materia Medica with Special Reference to Dental Students...........1042
Method (A) of Treatment to Promote the Utility of Pulpless Teeth................... 131
Methods in Crown- and Bridge-Work ...................... 142
Misapplication (The) of Gold Crown- and Bridge-Work.... 216
Only a Baby Tooth............. 862
Photo-Micrography ............ 149
Physical Changes that take place in Tissues under Pressure.... 297
Plastic Fillings................. 675
Preparation (The) of Compound Cavities in Anterior Teeth ...................... 124
Profession (The) and its Relations to the Artisan and to the Layman .................... 769
Prosthetic Dentistry............ 662
Relation (The) of Examining Boards to Dental Education.. 960
Restatement (A) of the Tooth-Bleaching Problem........... 748
Secondary or Storage Batteries for Cataphoresis.............. 128
Several Cases of Corrected Irregularities of the Teeth, with Models and Appliances....... 936
Some Facial Deformities and Their Prevention............. 948
Some Hard Cases for Cataphoresis, with Suggestions....... 373
Some Practical Points in Crown- and Bridge-Work............. 933
Some Suggestions in Prosthetic Dentistry .................... 366
Some Thoughts for the Dentist. 940
Status (The) of the Degree D.D.S. under the Law........ 572
Suggestion as a Factor in Controlling Patients during Dental Operations .................. 644
Treatment of Carious Approximal Surfaces in Bicuspids and Molars ...................... 39
Treatment of Pulpless and Ulcerated Teeth................. 775
Use (The) of Formalin........ 855
What Shall We Do?............ 141

## PROCEEDINGS OF SOCIETIES.

Alumni Association, Boston Dental College...............1046
Alumni Society of the Philadelphia Dental College.......... 473
American Dental Society of Europe ........................ 869
American Medical Association, Section on Stomatology, 657, 757, 859, 948, 1037
Annual Convention of the Sixth, Seventh, and Eighth District Dental Societies of the State of New York..... 53, 223, 304, 382
Board of Examiners Dental Association of the Province of Quebec .....................1047
Central Dental Association of Northern New Jersey........ 387
Chicago Dental Society......... 474

Columbus Dental Society....... 474
Connecticut State Dental Association ..................... 783
Dental Society of the State of New York....... 474, 662, 763, 832
Eastern Illinois Dental Society.. 386
Eighth District Dental Society of the State of New York..... 326
First District Dental Society, State of New York, 134, 309, 366, 470, 755, 1021
G. V. Black Dental Club....... 474
Harvard Dental Alumni Association ..................... 782
Louisiana State Dental Society.. 385
Minnesota State Dental Association ......................... 869
Missouri State Dental Association ......................... 782
National Dental Association.... 866
National Dental Association, Southern Branch .. 387, 925, 1029
New York Board of Dental Examiners .....................1046
New York Odontological Society....198, 312, 458, 558, 744, 1012
North Carolina Dental Society.. 579
Northeastern Dental Association, 37, 139, 206
Ohio State Dental Society, 121, 286, 371
Quonehtacut Dental Club....... 66
Reading Dental Society........ 870
Seventh District Dental Society of New York.....575, 675, 769, 933
Southern California Dental Association................682, 1045
Southern Dental Association.... 57, 144, 213
Texas Dental Association...... 783
Tri-State Dental Meeting of the Michigan, Indiana, and Ohio Dental Associations.......643, 846
Union Meeting of the Maryland State Dental Association, Washington City Dental Society, and Virginia State Dental Association....568, 778, 855, 960
Vermont State Dental Society.. 386
Washington City Dental Society 151
Washington State Dental Society ........................ 579

## DENTAL COLLEGE COMMENCEMENTS.

Atlanta Dental College......... 395
Baltimore College of Dental Surgery .................... 391
Baltimore Medical College, Dental Department.............. 587
Birmingham Dental College.... 584
Boston Dental College.......... 683
Central College of Dentistry.... 588
Chicago College of Dental Surgery ........................ 389
Cincinnati College of Dental Surgery .................... 389
College of Physicians and Surgeons of San Francisco, Dental Department............... 685
Columbian Dental College...... 396
Columbian University, Dental Department ................ 588
Detroit College of Medicine, Department of Dental Surgery.. 580
Harvard University, Dental School .................... 684
Indiana Dental College......... 583
Kansas City Dental College.... 389
Marion-Sims College of Medicine, Dental Department...... 398
Meharry Medical College, Dental Department.............. 398
Milwaukee Medical College, Dental Department........... 682
Missouri Dental College........ 586
National University, Dental Department .................... 587
New York College of Dentistry. 580
New York Dental School...... 588
Northwestern College of Dental Surgery .................... 584
Northwestern University Dental School ..................... 391
Ohio College of Dental Surgery 395
Ohio Medical University, Department of Dentistry........ 475
Pennsylvania College of Dental Surgery .................... 388
Philadelphia Dental College.393, 582
Pittsburg Dental College....... 387
Royal College of Dental Surgeons of Ontario............. 585
Southern Medical College, Dental Department............... 583
Tacoma College of Dental Surgery ........................ 585
Tennessee Medical College, Dental Department........... 397
University of Buffalo, Dental Department ................ 582
University of California, College of Dentistry................. 870
University of Colorado, Dental Department ................ 587
University of Denver, Dental Department .................589
University of Iowa, Dental Department ................... 683
University of Maryland, Department of Dental Surgery...... 396
University of Michigan, College of Dental Surgery........... 684
University of Minnesota, College of Dentistry................. 584
University of Pennsylvania, Department of Dentistry........ 581
University of Tennessee, Dental Department ................ 476

Vanderbilt University, Department of Dentistry............ 475
Washington Dental College..... 588
Western Dental College........ 393
Western Reserve University, College of Dentistry.......... 586

DENTAL SOCIETY ANNOUNCEMENTS.

American Dental Society of Europe ......................... 400
Baltimore College of Dental Surgery ...................... 227
Bi-State Dental Meeting....... 686
California State Board of Dental Examiners ................... 589
California State Dental Association ......................... 479
Colorado State Dental Association ......................... 399
Dental Commissioners of Connecticut ..................... 400
Dental Society of the State of New York ................... 327
Eastern Ontario Dental Association ......................... 590
Harris and Lebanon Valley Dental Associations............... 327
Harvard Odontological Society. 227
Illinois Board of Dental Examiners ........................ 227
Illinois State Dental Society.... 327
Iowa State Dental Society...... 328
Isaac Knapp Dental Coterie....1048
Kansas State Dental Association ......................... 327
List of Committees for the Joint Meeting of the Southern Branch of the National Dental Association and the Louisiana State Dental Society..... 686
Louisiana State Dental Society. 67
Maine Board of Dental Examiners ........................ 479
Maine Dental Society.......... 590
Massachusetts Board of Dental Examiners ................... 67
Massachusetts Board of Registration in Dentistry...152, 478, 969
Massachusetts Dental Society... 399
Minnesota State Dental Association ......................... 686
Missouri State Dental Association ......................... 477
National Association of Dental Examiners ................... 783
National Association of Dental Faculties ................... 685
National Dental Association.... 398, 476, 685
National School of Dental Technics ........................1047
New Jersey State Dental Society ....................... 400
New Jersey Summer Examinations ...................... 478
New York Odontological Society ....................... 968
North Carolina State Dental Society ....................... 153
North Dakota Board of Dental Examiners .................. 590
Northeastern Dental Association 870
Northern Illinois Dental Society 870
Northern Iowa Dental Society.. 153, 478
Odontographic Society of Chicago .................... 152, 227
Pennsylvania Board of Dental Examiners..........328, 478, 1048
Pennsylvania State Dental Society ....................... 476
St. Louis Dental Society....... 152
Southern Kansas Dental Association .......................1048
Southern Wisconsin Dental Asciation ......................1048
Tennessee Dental Association.. 477
Texas Dental Association...... 327
To New Jersey Dentists........ 400
Tri-State Dental Association...1047
Tri-State Dental Meeting....... 328
Union Meeting in Baltimore.... 399
Union Meeting in Nova Scotia.. 590
Vermont State Board of Dental Examiners ...............67, 784
Vermont State Dental Society.. 153
Washington State Dental Society ....................... 399
West Virginia State Board of Dental Examiners............ 328
Wisconsin State Dental Society 477

EDITORIAL.

Again. The New Jersey Dental Law...................... 691
Aluminum and Mercury........ 590
American Dental Weekly (The) 231
Appointment (The) of Mr. Charles S. Tomes............ 592
Bacterial Factor (The) in Phagedenic Pericementitis........ 969
Correction ..................... 786
Crowded Pages ................ 693
Dentist or Stomatologist?...... 484
Dentists in the Army and Navy.. 593
Excess of Matter............... 156
Excursion (The) to the Meeting at Omaha................... 693
Excursion to National Dental Association Meeting.......... 593
Human Side (The) of the Dental Practitioner ................. 153
Indiana Dental Journal (The).. 156
Law and Morality.............. 228
Law *vs.* Anarchy............... 67

Medico-Chirurgical College (The) may confer D.D.S., Ph.G., and Ph.D. Degrees.... 481
Mene, Mene, Tekel, etc........1048
New Dental Law of New Jersey (The) ........................ 403
Omaha Meetings (The)........ 871
Oral Syphilis .................. 479
Percentage Solutions .......... 483
Professional Journalism........ 688
Professor W. D. Miller......... 155
Proposed Amendment (The) of our Patent Laws............. 401
Sadness of "The Lancet" resulting from Chloroform Fatalities 407
"Secret" and "Proprietary" Preparations ................ 330
Twice-Told Tales............... 784
Vague and Indefinite Cachectic Conditions due to Latent Rheumatic or Gouty Tendencies ........................ 328

BIBLIOGRAPHICAL.

Anatomy and Histology of the Mouth and Teeth (Broomell) 974, 1051
Books Received ............... 488
Cataphoresis (Morton) ......... 232
Gould's Pocket Pronouncing Medical Dictionary...........1054
Gray's Anatomy ............... 789
Harris's Dictionary of Dental Science .................... 973
Information for Dentist and Patient ........................ 975
L'Art Dentaire en Médecine Legale ...................... 974
Manual of Dental Anatomy.... 485
Mechanical Practice in Dentistry 596
Oral Pathology and Practice (Barrett) .................... 786
Orthodontia (Guilford) ........ 788
System of Dental Surgery...... 232
Text-Book of Dental Pathology and Therapeutics (Burchard).. 594

OBITUARY.

Allen, Harrison................ 76
Boice, Alonzo.................. 234
Chase, Henry S................ 233
Colton, Gardner Q............. 874
De Trey, Emil A............... 875
Evans, Thomas W...........71, 156
Gage, Arthur R................ 599
Johnson, William L............ 598
McLeod, Eugene V............ 77
O'Connor, M. J................ 790
Richardson, W. E.............. 331
Richmond, George P........... 790
Southwick, Albert P............ 597
Van Vleck, William B.......... 235

DENTAL LEGISLATION.

Amended Dental Law cf New York ........................ 489
Dental Law of Georgia......... 158
Dental Law of New Jersey..... 408

PUBLISHER'S NOTICES.

Why Read the Dental Cosmos? 79
Expiring Subscriptions.........1060

PERISCOPE.

Best Antilithic Remedy (The).. 245
Brenzcain .................... 600
Chloroform Anesthesia by Gaslight ....................... 599
Clinical Experience with Formagen ......................... 494
Comparative Value (The) of Holocain and Cocain......... 599
Death through Swallowing a Tooth ....................... 600
Dental Legislation in Great Britain ...................... 162
Dental "Wax".................. 78
Dirty Wax..................... 162
Disease of the Antrum......... 791
Ether Anesthesia .............. 245
Eucain in Dental Practice...... 246
Eucain A in Dentistry.........1054
Fractures of the Lower Jaw and their Treatment.............. 235
Here it is Again!............... 161
How to Insert Root-Canal Dressings ................... 162
Ichthyol in Dentistry........... 599
Low Fusible Metal (A)........ 498
Nitrate of Silver in Dentistry... 875
Nitrous-Oxid Anesthesia....... 497
Orthoform .................... 161
Perspiring Hands ............. 245
Poisoning by the Use of Cataphoresis ...................... 600
Powder (A) for Difficult Dentition ......................... 245
Practical and Theoretical Trials of Formagen................. 490
Prescription Incompatibility.... 600
Removal of Teeth from Rubber Plates ...................... 78
Rubber Matrix................. 162
Sensitive Dentin............... 162
Substitute (A) for Articulating Paper ....................... 78
To Retain Rubber-Dam........ 78
Treatment of Alveolar Pain after the Extraction of Teeth...... 600
Uninflammable Celluloid....... 162

HINTS, QUERIES, AND COMMENTS..80, 162, 246, 331, 413, 498, 601, 791, 877, 975, 1057

MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE........82, 165, 249, 334, 417, 500, 602, 694, 793, 877, 978, 1061

MONTHLY RECORD OF PATENTS RELATING TO DENTISTRY ..........84, 168, 248, 333, 420, 504, 601, 696, 796, 800, 977, 1064

INDEX TO VOLUME XL.........................................1065

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Thomas W. Evans

THE

DENTAL COSMOS.

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# ORIGINAL COMMUNICATIONS.

## VARIETIES OF DENTAL CALCULI.

BY HENRY H. BURCHARD, D.D.S., M.D., PHILADELPHIA, PA.

DEPOSITS of calculi, as found upon the human teeth, are commonly divided into two classes: salivary calculi, or those having their origin in a deposition of the calcium salts held in solution by the saliva; and serumal calculi, or those whose origin is traceable to the blood serum,—the former the ptyalogenic calculi, the latter the hematogenic calculi of Peirce.

This classification is not only insufficient to describe the several forms of calculus found, and their distinctive modes of origin; it but vaguely and meagerly indicates the conditions under which calculi form.

As pointed out in a previous essay (DENTAL COSMOS, October, 1895), calculary deposits found in any part of the body are formed in consequence of a precipitation of calcium salts in some organic menstruum; the calculus consists of a combination of the calcium salts with the organic material. There must first be established conditions under which calcium salts previously held in solution are precipitated. These conditions vary in different situations in the body, as do also the chemical composition of the precipitated salts and of the menstruum in which they are deposited and cemented together. The most common of the cementing materials is mucin and allied substances. In calculi found in some situations in the body, notably in the bladder and gall-duct, the albuminous stroma in which calcic material is contained is of distinctive structure, the form of the calculus remaining after the calcium salts have been removed through the action of dilute acids.

The general conditions of calculus formation are thus set forth by Thoma:*

"The formation only occurs when some exciting cause of disease of external origin gives rise to pathological conditions of the mucous membranes, which provide the organic albuminoid basis for the concretions."

Regarded in this light, the organic albuminoid framework found in the concretions is of very great importance in the formation of calculi. This organic framework and its relation to catarrhal conditions did not escape the notice of the older chemists and pathologists. As early as 1818, Joh. Friedr. Meckel spoke of the possibility of the "animal-mixed substance" causing the cohesion of certain substances,—*i.e.*, the deposit of crystalline salts. It was the work of Ebstein, Posner, Hannyn, Studensky, and others, however, that first clearly traced the action of the organic (generally albuminous) basis or stroma of the concretions. From these authors it was learned that albuminous substances can separate out crystalline salts from their solutions in the same way as the albumen of the hen's egg, according to Steinmann's discovery, separates carbonate of lime from various solutions of lime-salts. Kindred reactions were observed by Rainey, Harting, and Ord in the formation of the calcium albuminate known as calcoglobulin. The above quotation from Thoma, but recently found, is made in substantiation of the statements made by the present writer two years ago, that mucin or allied substances formed a necessary part of the salivary concretions found in the human mouth. From the fact that minute quantities of lactic acid caused, out of the mouth, inspissation of the mucus of the saliva, and, if present in greater amount, coagulation of the mucin, in an agglomerating and condensing light coagulum, it was inferred, then, that in this inspissation was found the explanation of growing concretions; calcium salts are precipitated in the mucous stroma, and, finding lodgment in favorable situations, the beginning of a calculus is established. The anatomical reasons for the point of deposit selection were set forth in the DENTAL COSMOS, November, 1895. In the same essay was set forth at length the association of catarrhal marginal gingivitis as the cause of deposits of subgingival calculi, which differed materially from the ordinary salivary calculus.

The writer has but little to add to the major premises of the original essay dealing with the origin of salivary calculi, believing that, except in some minor particulars, the opinions advanced are correct. The purpose of the present essay is to point out that, instead of but two classes of dental calculi, there are certainly five distinct varieties,—distinct, in that each is associated with distinctive pathological states and chemical conditions.

Three of these classes—two of them undoubtedly—are of salivary origin, the doubtful member of at least partial salivary origin, while two of them may be fitly termed serumal, or hematogenic.

---

* "General Pathology," vol. i, 1896.

The first class consists of the yellowish-white deposits found upon the buccal surfaces of upper molars. The second class includes the calculi found first upon the lower anterior teeth, opposite the ducts of the submaxillary and sublingual glands. The third class comprises those dark, flattened, hard, scale-like calculi found immediately beneath the gum-margin.

This variety is at times associated with the first and second classes.

The fourth class consists of those small nodular calculi found deep in the pockets of pyorrhea cases and upon the apices of roots in cases of long-continued apical abscess. The fifth class includes those deposits which are found upon the sides of roots in cases of gouty necrosis of the pericementum, and which exhibit in some degree a reaction to the murexid test,—*i.e.*, which contain urates.

Two or more of these varieties may exist upon the tooth-root at the same time.

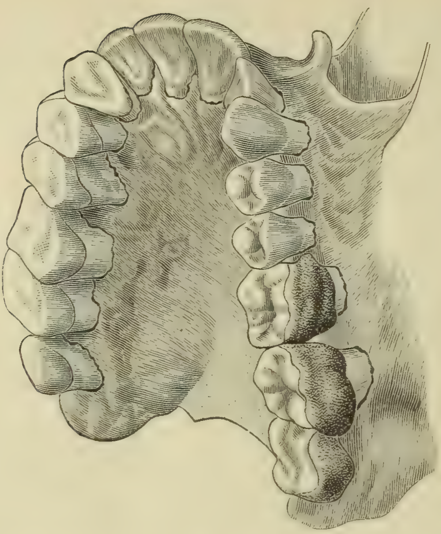
The conditions of chemical precipitation are probably alike for all of the purely salivary concretions, calcium phosphate and carbonate being held in solution in the saliva contained in the acini and ducts of the salivary glands by carbon dioxid; when the saliva is exposed to the air, the carbon dioxid is disengaged and the calcium salts are precipitated. Calculi formed in other situations, and not salivary in origin, probably have other chemical surroundings which determine the precipitation.

The first class of calculi—those found upon the buccal faces of upper posterior teeth—present these features; they are yellowish-white, and are comparatively soft and friable. They dissolve readily in dilute hydrochloric acid with the evolution of carbon dioxid, and leave but little detritus and apparently no distinct evidences of an organic stroma,—*i.e.*, they are largely composed of calcium carbonate, with a minimum admixture of organic material. The parotid secretion to which they owe their origin contains a much greater percentage of calcium carbonate than of the phosphate, and, instead of mucin, contains a globulin.

The calculi are formed in greatest amount under the following conditions, summed up in disuse of the teeth underlying the deposit: If, owing to dental diseases or the loss of the posterior lower teeth, the upper molars come to a condition of disuse, not only do the normal cleansing agencies of the teeth fail, but a condition of stagnation is brought about in the parotid secretion which lies in the pocket formed between the cheek and alveolar wall and teeth. (Fig. 2.) In this pocket the calcium salts are precipitated, combining with the dilute mucoid secretion of the buccal glands. This condition is well shown in Fig. 1, in which the posterior teeth of one side have been in continuous disuse, and, as will be seen, the teeth of the opposite side have received excessive use.

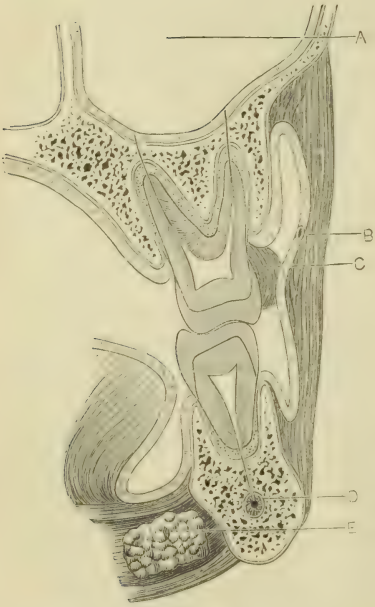
The calculi of the second class—those formed first upon the lingual faces of the lower anterior teeth (Fig. 3)—are made up, in large part, of calcium phosphate, combined with mucin. Like

FIG. I.



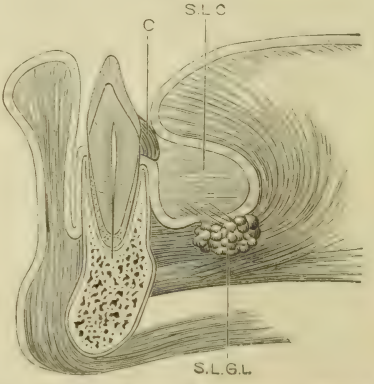
Right side, Abrasion from over-use; Left side, Deposits due to stagnation.

FIG. 2.



A, Maxillary sinus; B. Duct of Steno; C, Parotid calculus; E, Submaxillary gland.

FIG. 3.



C, Calculus; S. L. C., Sublingual cavity; S. L. GL., Sublingual gland.

the previously described form, they may contain dead epithelial cells, leptothrix, and foreign materials. A foreign substance which has found lodgment frequently acts as the nidus of a deposit. A rough or irregular surface will also determine a point of deposit.

While these deposits occur in the mouths of persons who have apparently no morbid conditions present, their extent and rapidity of progress appear to be in the ratio of the health of the oral soft tissues. They are marked and in greatest amount in patients who exhibit a general subcatarrhal condition of the oral mucous membrane, in which the increased mucous secretion of the oral glands combines with excessive ropy secretion, particularly of the sublingual gland. Their occurrence has a direct and quantitative relationship with the extent of mucous secretion or excretion.

The occurrence of this and a succeeding variety of calculus is common in the mouths of domestic animals and those in captivity, in which the food habit invites debility of the oral tissues and excessive fermentations. It is a clinical fact worthy of note that the prevention of oral fermentations acts as a strong deterrent to calcic deposits. Subcatarrhal conditions are common in the mouths of patients who wear artificial dentures, and excessive deposits of salivary calculus occur at times upon the lingual aspect of lower plates, upon the alveolar aspect also if the adaptation of the plate be inaccurate.

The next variety of calculus—the small, dark, hard, scaly deposits found beneath the gum-margin (Fig. 4), which excite the most common and most curable variety of pyorrhea alveolaris—is intimately associated in its formation by a pre-existing marginal gingivitis. After having formed, these calculi act as persistent irritants to continue the gingivitis and excite degenerative changes in the pericementum. This is the variety of calculus usually described as serumal. Furthermore, all deposits upon tooth-roots other than those described have been included under this one head, —an error of classification, as will be seen.

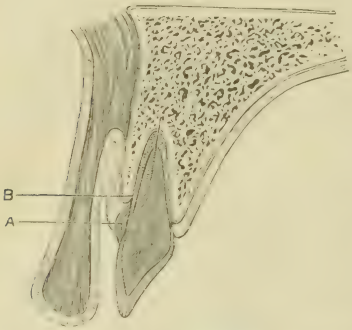
The existence of a marginal gingivitis causes a swelling of the gum-margin and a consequent eversion, with the formation of a V-shaped pocket between the gum and tooth. To this pocket the saliva has free access. In consequence of the catarrhal inflammation, dead epithelial cells and an altered secretion are oozing into the space, combining with the saliva holding the calcium salts in solution. These three factors are in themselves sufficient to determine a precipitation of the calcium salts and the formation of a mucous stroma calculus. Beyond doubt, other organic substances than mucin are present, which may play an unknown but essential part in determining the physical and chemical characters of the calculus. The products of fermentation are present, so that the reaction of particularly lactic acid with mucin must be taken into account. This, no doubt, has to do with the additional hardness of the calculus. Another interesting reaction is probable in the presence of lactic acid,—viz, the reaction of the very dilute acid upon calcium phosphate, which produces the lacto-phosphate of calcium. As noted in connection with dental caries, calcium phosphate is decomposed by strong lactic acid, forming calcium lactate, a soluble substance.

The part played by chromogenic bacteria, or, for that matter, the origin and nature of the coloring substance in these dark calculi, is unknown. It is common in the calculi arising through local catarrhal or other disease processes; rare in those of the first and second classes.

When, however, gingivitis has been excited by the presence of calculi of the first and second classes, the hard, sparse calculus frequently forms beneath and about the edges of the first calculus at its point of contact with the gum.

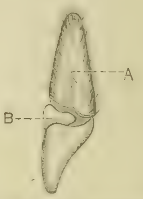
The presence of these deposits excites progressive degenerative changes and destruction of the retentive apparatus of the tooth, the pericementum, and alveolar process in a distinctive manner. There is a recession of pericementum, which keeps pace with the atrophy of the alveolar wall. (Fig. 4.) The walls of the pocket between soft tissues and the tooth become infected early by pyogenic organisms, and pus-formation occurs, hastening the pericemental destruction. If the tooth be extracted at a comparatively early date, a dark, scaly calculus is seen to occupy the cervical portion of the root; beyond this is an area of tooth-denudation, in which no deposits are found, and, toward the apex, the shreds of the thickened pericementum. (Fig. 4 A.) There is always a space between the pericementum and calculus, showing that detachment or loss of the pericementum is in advance of the calculus. If the tooth be extracted or examined after pyorrhea (pus-flow) has persisted for a long time, it is common to find the areas of denudation lying beyond the primary calculus to be incrusted by numbers of small, hard, dark, nodular deposits, which lie in the area of necrosis as small islands. This is the fourth variety of calculus; called a variety because its appearance has such an association with long-continued suppuration that it seems a consequence of such conditions. An examination of a root such as described will usually

FIG. 4.



A, Subgingival calculus; B, Receding pericementum.

FIG. 4 A.

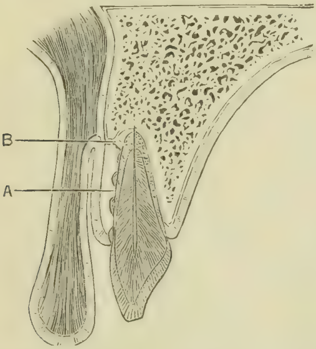


A, Thickened pericementum; B, Subgingival calculus.

show the original calculus to be confined to the cervical portion of the tooth, unless, in the progress of the disease, recession of the gum-margin has occurred, in which event successive portions of the root underlie the gingival margin and the pus-discharging pockets are shallow. In this case the conditions existing are continuously those of subgingival calculus formation.

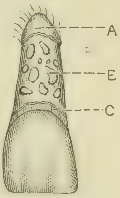
This distinction is more marked in the second and more malignant class of pyorrhea cases, those well described by Black as phagedenic pericementitis. (Fig. 5.) In these cases progressive necrosis of the pericementum and disappearance of alveolar walls may occur without the presence of a subgingival calculus or the formation of any perceptible calculi upon the tooth-roots, the disease beginning without an initial gingivitis. An instrument passed into the pocket formed in consequence of the death of pericementum and alveolar atrophy may reveal no roughness whatever, except that of the denuded alveolar edge, a constant and diagnostic sign of this condition. It must be inferred, therefore, that calculi play no necessary part in either the induction or continuation of this disease, and that the deposits must be regarded as an epiphenomenon and not the cause of the death of pericementum. Infection by pyogenic organisms is the general, though not invariable, rule, so that secondary disease processes arise. If the case be long-continued, pus-formation and discharge are inevitable attendants of the disease. If the root of such a case be examined—for this disease may be confined to one tooth, or even one root of one tooth, another feature to distinguish it from the first variety of pyorrhea—the smoothness of the area of denudation has been replaced by a roughness readily detected by the instrument. A tooth extracted at this time will show the root incrusted with small, dark, nodular deposits, which may be so adherent as to require a file for their removal. (Fig. 5 A.) These calculi dissolve with some difficulty in dilute acids. The deposits occur in the area of denudation; they do not lie close to the remains of the pericementum, and are perhaps identical with the incrustations which at times cover the apices of the roots of teeth in cases of long-continued chronic abscess.

FIG. 5.



A, Calculi of pyogenesis; B, Ulcerous pericementum.

FIG. 5 A.



A, Thickened pericementum; C, Subgingival calculus; E, Calculi of pyogenesis.

They are found again upon the roots of teeth whose pericementum has suffered from gouty necrosis, after infection of the disease area occurs, and pus-formation discharging at the neck of the tooth has been continued for some period.

The formation of calculi under these circumstances is, no doubt, an expression of the process found in other parts of the body, in which necrotic tissue appears to exercise a selective affinity toward the calcium salts of the blood.

The distinction between these two varieties of root-deposit appears to be entirely warranted and necessary: The subgingival deposits due to a deposition of calcium salts derived from the saliva in the products of local catarrhal inflammation; the nodular root deposits, an infiltration of dead connective tissue (in any of its forms) with the calcium salts derived from the blood directly or from pus.

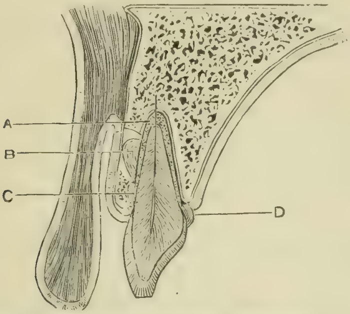
The next, or fifth, class of calculus is that regarding which there has been so much controversy during the past five years,—gouty calculi. These deposits may be associated with the subgingival calculi and those of pyogenic origin, so that much confusion has arisen from the lack of discrimination.

A typical gouty incrustation presents these features: A tooth exhibits the symptoms of acute apical pericementitis; a bistoury passed into the apex of the swelling over the root may give vent to a glairy, mucus-like discharge, or, in some cases, pus flows. A further examination may reveal the loss of underlying alveolar wall; exposing the root, which is partially denuded of pericementum in this area of denudation, the presence of a calculus is detected. The pulp responds to tests for its vitality, and the gum-margin and marginal pericemental attachment appear to be intact. (Figs. 6 and 6 A.) A chemical test of the calculus shows it to respond in some degree to the murexid test,—*i.e.*, it contains urates. These deposits in their typical form are irregular and more friable than either the subgingival deposits or the other root-deposits named. The bulk of the calculus is made up of calcium phosphate, a common associate of deposits of urates in other parts of the body.

If the inflammation find spontaneous vent for its products at the neck of a tooth and continued pus-formation occurs, the wall of the fistula represented by the tooth-root may become—usually does become—incrusted by small, hard, nodular deposits. Gouty patients furnish a predisposition to the conditions which lead to the formation of subgingival calculi and to phagedenic pericementitis, so that, while gouty patients frequently do lose their teeth through the pyorrhea following upon subgingival deposits and attendant upon phagedenic pericementitis, either or both of these diseases may progress to a termination without the formation of typical gouty calculi. It is usual to find, however, in the deeper deposits of these cases that a faint response to the murexid test may be obtained. As soon as pyorrhea arises, the gouty pericementitis is indistinguishable, clinically, from phagedenic pericementitis. In phagedenic pericementitis the deposits of calculi have occurred as secondary to a primary necrosis. In the gouty cases the original uratic deposits occur before the disappearance of an area of pericementum, and excite further inflammation and necrosis.

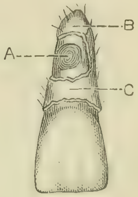
These distinctions are made not alone for purely pathological reasons, but on account of the bearing they have upon therapeusis of the several conditions. The therapeutics of any morbid condition can only be entirely rational when the causes which underlie the occurrence of disease are made out, together with the nature of the anatomical changes induced.

Fig. 6.



A and C, Vital pericementum ; B, Gouty calculus ; D, A subgingival calculus.

Fig. 6 a.



A, Calculus in area of necrosis ; B and C, Vital pericementum.

Accepting that these five varieties of calculus owe their origin to distinct sources and are accompaniments of definite morbid conditions, it is evident that the indicated therapeusis should differ for each of them, as indeed it does. Measures directed toward the removal of one form and the correction of the condition of its formation may be entirely insufficient and incorrect for the removal or cure of other forms, with their attendant conditions.

# THE PROMINENT CAUSES OF FAILURE IN THE USE OF ELECTRICITY IN DENTISTRY.

BY PROFESSOR C. S. NEISWANGER, CHICAGO, ILL.

(Read before the Southern Dental Association, August 3, 1897.)

Electricity is a natural phenomenon, and the only way to accomplish results, either physical or therapeutical, is to observe closely and try to interpret the language in which nature speaks to us.

Let us compare electricity with some of the other forces with which we think we are familiar, and see how closely they are related. The latest and most plausible theory regarding electricity is, that it is a mode of motion or other manifestation of a very exceptional form of matter called the ether, which permeates all bodies and pervades all known space, even to the most distant star. If, then, this is electricity, we can see at a glance that we have more of it than anything else we know of, but it is not manifest to us, because it exists in a latent or passive state, and in order to convert it into energy which we can utilize we must destroy its equilibrium, and kinetic energy is generated when it seeks to restore that lost equilibrium, much the same as water, when raised above its level, can be made to do work by the pressure it exerts,—*e.g.*, a mill-race.

A copper wire is strung up along the street on poles, and although the wire is immersed, as it were, in electricity (ether), and is a good conductor of the same, we have no current or flow, because the electric level is not disturbed; but put a force-pump (dynamo) at one end of the line, and we can do work in proportion to the pressure exerted by the dynamo, such as operating motors, electric lighting, etc.

Light is only a transverse vibration of this same ether, the wave lengths being infinitesimally shorter than the other forces, the vibrations of red light being about 400,000,000 per second. Heat and sound are apparent to us by the aid of the same medium, the waves being longer.

We know the laws that govern electricity just as well as we know the laws regulating light, heat, sound, and gravitation, and when we observe that they are elucidated by a mathematical process much of the mystery surrounding them is dissipated, and we look upon them as cold facts capable of being demonstrated; but when we come to consider the fact that all animal and vegetable life is not only due to, but dependent upon, the electrical conditions that surround them, is it not reasonable to suppose that we should be able to restore the equilibrium of the body (health) by supplying electricity from some outside source?

In order to make what is to follow better understood, it will be necessary to consider briefly here the three fundamental principles of electricity, which, although they may be plain to a great many present, will serve as a leader to the subject-matter which is to follow:

*First*, voltage is pressure or push-power, and is not electricity, but the force which impels it, and is produced by a difference of electric level. Of course, the greater this difference of electric level, the greater the voltage or push-power.

*Second*, if we are doing our cataphoric work with a battery of cells, this voltage or difference of electric level is caused by the difference of potential between the two elements within the cell. For instance, suppose we immerse a piece of zinc and a piece of iron in an acid or other exciting fluid, the zinc and iron will be attacked by the fluid in nearly the same proportion, and the difference of potential between the two metals will be so small that the resulting voltage or push-power will be very little. If, now, the two substances to be immersed are zinc and silver chlorid, the zinc is acted upon more readily than the silver chlorid, and we consequently have a greater difference of potential or voltage; but suppose the two elements to be zinc and carbon, the zinc is acted upon readily, while the carbon is unaffected by the fluid, and, consequently, these two bodies give us the greatest difference of potential, and a higher voltage or push-power is obtained by their use than by any others.

*Third*, amperage is electricity or current, and is not to be confounded with voltage, for, although each is a component part of electrical energy, they serve an entirely different purpose. The water in the river represents amperage, the swiftness with which it flows (caused by difference of level) the voltage. We may have a very large river flowing slowly or a small stream running swiftly, and, just so, we have electrical currents of high amperage and low voltage, or *vice versa*.

The most prominent causes of failure in this class of work I have attributed to three factors,—viz: The battery; the controlling device; the manipulation of the electrodes,—and each will be considered, both from a physical and therapeutic standpoint.

The galvanic current, sometimes called the direct or continuous current, is the one which we utilize in dentistry, and is generally produced by chemical decomposition, or is merely the conversion of chemical energy into electric energy, for it must be remembered that, while it is impossible to change matter from one form to another, it is easy to convert one manifestation of force or energy into another; as, for instance, heat-energy may be converted into mechanical energy, a good example being the steam engine.

It is well to also keep in mind the law of conservation of energy, which teaches "that there are no forces in nature to which the law of energy does not apply; the principle that the total energy of the universe is constant, no energy being created or destroyed in any of the processes of nature, every gain or loss in the form of energy corresponding precisely to a loss or gain in some other form or forms." This is the great fundamental principle of modern physics, and is just as applicable to electricity as any other force. The fact is, then, that the electrical energy we utilize for the obtunding of sensitive dentin, or other operations in dentistry, if derived from a battery of cells, is generated entirely by the chemical decomposition that takes place within the cells, and if we would generate electrical energy sufficient for our purpose, we must have a corresponding consumption of the fuel that keeps up the chemical decomposition; and this fuel must, of course, be renewed as required, much the same as the stove which furnishes heat must be supplied with coal as needed. Now, although the dentist would not expect his stove to furnish heat without a renewal of fuel, yet how many there are who must lay their failures in this branch of the work to being seduced by the attractive advertisements of those who would furnish them a battery of a few cells, as large as a man's finger, that is guaranteed to do heavy work for a period covering years. This is not particularly the fault of the dentist, because he has had no special training in that direction, but it has been very discouraging to the use of electricity in dentistry, because with such apparatus the operator is doomed to failure, as far as absolute results are concerned.

In dentistry we encounter usually a very heavy resistance to the passage of the current, and, as it is the current or amperage *that does the work*, we must have a sufficient voltage or push-power in our battery to overcome these large resistances. It has been reported by competent observers—and my experience has proven the fact to be true—that the average resistance encountered in obtunding sensitive dentin is about twenty-five thousand ohms; how much, then, could the dentist expect to accomplish with a battery of ten, fifteen, or even twenty small cells, which give less than one volt each?

Only a short time ago I was asked to give some advice to a dentist, or, rather, to see why he could not have the same results in cataphoresis as others, and found that his instrument consisted of a battery of small cells, twelve in number, which, upon being tested with a volt-meter, gave a pressure of only eight volts, and yet he wondered why he was not able to get results. Another dentist, whom I lately saw, had a battery of twenty cells, which, upon being tested, gave a pressure of only fourteen volts, which, of course, was not enough to push sufficient current through the resistance of the tooth to do any good whatever, unless the sitting was continued for a great length of time.

So much for the battery; and now I will say a few words upon the means of controlling or regulating the current. A great many devices have appeared upon the market for this purpose, many of them good, but it has been almost universally recognized that the instrument in which the patient is in shunt is the most desirable to use. It should be so constructed that it will control the current in absolutely gradual gradations, and not by steps; in no instance is it advisable to increase the current cell by cell, because this would be very painful in a hypersensitive cavity.

An instrument in which the resistance is composed of German-silver wire is not so good as that composed of graphite or carbon, for this reason: The passage of electricity through any resisting medium always generates heat, and when the German-silver wire is heated the resistance is increased, and, instead of the tooth receiving an increase of current gradually, the same will drop back, on account of the increased resistance of the wire, and we are constantly going over the same ground twice, as it were, because, after tolerance has been established to a certain amount of current, its flow will drop back again and have to be re-established by a forward movement of the instrument. This is a very prominent cause of failure, which has not, I believe, been heretofore recognized.

With the graphite instrument the heating, which also takes place, decreases its resistance, and, consequently, after the movement of the rheostat to a certain point, the meter will constantly and very slowly indicate the passage of a larger amount of current caused by the decreased resistance of the graphite when heated. Briefly, the wire rheostat causes a fluctuation of the current backward and forward, on account of the increased resistance of the wire by heating, while, for the same reason, with the graphite instrument a steady, but gradual, increase of current is maintained throughout the operation.

The term "volt-selector," which has been used to a considerable extent in connection with cataphoric work, means nothing; a volt-selector is a current-controller, and the more voltage or pressure we have the more current is pushed through the resistance we encounter.

A pressure of twenty volts may push as much as one milliampere of current through the tooth of a certain patient, while the same pressure may push one-half or double as much current through the next patient who takes the chair; this is due to the different resistance of the two patients. If, therefore, it is the amount of current that does the work, a milliamperemeter is the proper thing to have in the circuit, and not a volt-selector. Without the meter it is impossible to tell how much current the patients are receiving, or whether they are receiving any at all, and it is the only safe guide which the dentist can have. It is true that the amount of current for obtunding sensitive dentin in any given case has never been definitely determined, as a large cavity will allow the passage of more current than a small one, because the resistance is less, but in any case it is quite a satisfaction to see the indicator upon the meter move and to know that the patient is getting no more or no less than is indicated upon its face.

In conclusion, and to recapitulate, let your battery have at least a pressure of forty or fifty volts. I do not believe less than this is capable of doing some of the work required in dentistry. Less cells may do some of the work, but with the pressure mentioned above we have at least a reserve force to be used for other cases. The rheostat, or current-controller, should increase and decrease the resistance gradually, and not by steps. It should be of graphite or carbon with the patient in shunt. The electrode should be supported and controlled by the hand. A good meter, with a range of scale to five or more milliamperes, graduated in one-tenth milliampere divisions, should always be in the circuit; and with such apparatus, and by paying due regard to polarity and the electro-sensibility of your patients, I believe you will have no reason to regret the use of this valuable agent in your practice.

Almost all the good results obtained from electrical treatment are obtained by the expenditure of much time and patience on the part of the operator, and if you have not the time to devote to it, you had better not attempt it at all; you will only hurt the remedy, and be doomed to disappointment. Should you, however, not be overburdened with practice, there is no better way of increasing it and having the confidence of a grateful class of patients than by its judicious use as a remedy, or an adjunct to other remedies.

# PAINLESS DENTISTRY.

BY DR. L. S. GOBLE, ROCHESTER, N. Y.

(Read before the Annual Convention of the Sixth, Seventh, and Eighth District Dental Societies of the State of New York, October 26, 1897.)

THE object designated by the title of this paper is one for which reputable dentists all over the country are striving, and finding only in the claims of those modest "know-all's," "the advertising dentist." Yct there is a great field for investigation in "painless dentistry." Patients are demanding the performance of good work with little or no pain, a result that sometimes is quite impossible. Now, while it is difficult or impossible to perform some operations painlessly, the large majority of them can be. There are four ways by which this may be done. First, by better instruments; secondly, more exact data; thirdly, medication; fourthly, absolute truthfulness.

As to instruments, burs should be sharp and not held in the tooth a full note, "fortissimo," but an eighth note, "pianissimo," as our musicians would say, or running the engine rapidly, touching quickly, and remembering always to desiccate the cavity by the aid of chloroform and *warm*, not *hot*, air, before using the bur. Use chisels freely. Thin walls and long, overhanging ledges are, as a general thing, only in the way, and cause us to hurt the patient in removing decay through a small orifice. Where the operator cannot use a chisel, an enamel fissure bur should be used, and the walls made nearly perpendicular, care being exercised not to touch the inside of the tooth with the bur.

Most of the excavators manufactured are thick and dull; they should be as sharp and thin as a new moon. I always take my excavators to the laboratory and make them thin. One can readily see the advantage. A thin razor-like edge will slide under the decay and peel it out in layers, where the other spoon will only cause pressure and scrape the surface In every very sensitive tooth the direct method should be used as much as possible. In large cavities large, thin, sharp, straight spoon excavators should be employed, and by working on the line of circumference of the tooth one can often uncover the pulp with little or no pain, where a right or a left spoon excavator, bur, or other instrument would be torture because of pressure.

In removing a filling, which many consider a painful operation, much can be done for the patient. A sharp, thin, square-edged drill should be used to drill an angle whose apex will not endanger the tooth-pulp. After snapping out the angular piece, proceed as before until the filling is out. Under no conditions I have ever yet seen was it necessary to use a bur, and I think such dentistry barbarous. A cold sweat breaks out on me by just thinking what I once endured in that direction.

Jewelers' broaches are valuable instruments; they are as fine as a hair, and after removing the temper are almost as pliable. Remove the temper as follows: Place the broach in the flame of an alcohol lamp until red-hot; then, shielding the flame with one hand to protect it from drafts, raise the broach slowly until out of the flame and away from the heat, so letting it cool slowly. If it is heated and removed quickly from the heat it will be as hard as it was before. Their use will be described hereafter.

The hypodermic needle can be used with advantage with nearly every patient. I use the "Tiemann." They cost forty cents each, wholesale; are not reinforced, but are so fine you can put them through an ordinary hypodermic needle. A thick heavy needle jammed into the gum or pulp is very painful.

Desiccators and cataphoric outfits are instruments that also play an important part. So much for instruments.

Secondly, more exact data. Each case should be studied: the temperament of the patient, what he eats, how he brushes his teeth, and with what; whether the patient naturally has highly sensitive teeth, or sensitiveness superinduced by systemic derangement. I can only touch on this department of the subject.

Thirdly, medication. The first and most important of medicinal remedies is, in my opinion, oil of cloves. No one who has not made a study of painless methods can know the possibilities of this simple remedy. Teeth that will not yield to the touch of cocain, succumb to the benign influence of this antiseptic oil.

In removing the crown of a tooth, or in drilling a hole in a healthy tooth, the patient experiences little or no pain. The teeth are healthy, but, if bacteria are at work, nature, ever resistant against the encroachments of decay, throws out a wall of hypersensitive dentin. Oil of cloves restores the natural condition of the tooth by its germicidal and anesthetic effect. I know one man who has an exposed pulp in a lower left molar. He has put oil of cloves twice daily in that tooth for five years, and the cavity has not enlarged nor the tooth ached. For the last five years or more my method of handling this oil has been as follows: Take, for example, a sensitive tooth in which the least work is painful; open well, and with very warm water wash it thoroughly; if too tender to be even touched, have the patient put oil of cloves and alcohol, equal parts, in the tooth twice a day for one, two, or three days, according to the case, and pure oil of cloves twice daily for a week. When the patient comes I remove all *débris* and loose decay and gently lay a small piece of cotton soaked with chloroform, leaving it in the tooth three or four minutes. That is one way.

The other is to place oil of cloves in the tooth on cotton; saturate a piece of cotton with sandarac varnish and pack it in the tooth, leaving it there five days, and repeating the operation; then using chloroform as before. In either case, with thin spoon excavators you can remove all decay, nine times out of ten, without any pain. I have uncovered several pulps this way without the patient ever flinching. I used this method and cataphoresis on a fourteen-year-old patient. Her teeth were highly sensitive; her lower right and left molars were equally bad. I used warm water and hydrogen peroxid to cleanse the cavity, and chloroform and warm air to desiccate it. I then applied cocain with cataphoresis, and kept on applying for two hours and twenty minutes; and then half-killed her in preparing the tooth for filling. In the other molar I used oil of cloves and sandarac varnish twice, and after ten days filled the tooth without any pain whatever. When a decayed tooth has ached once or twice for a few minutes, or is sensitive to sweets or thermal changes, I believe oil of cloves the best obtunder known. For making grooves or retaining-points in solid tooth-structure, or for ordinary marginal fillings, cocain or desiccation I consider better. Some will ask why I use oil of cloves instead of other volatile oils. Some are unpleasant to taste; some are too volatile; others are poisonous. Oil of cassia, for instance, produces a rash like scarlet fever on a great many. I have six patients who cannot be touched with it. Pure phenic acid crystals I use for escharotic effects simply.

In hypertrophied pulps and removing pulp-filaments or healthy pulps for bridge-work, in the first case dry the exposed pulp and place on it a crystal of phenic acid; it is highly deliquescent, and will extract moisture from the pulp-tissue and sear it; with a fine needle inject cocain solution and remove the pulp; there is no pain whatever in the operation if the work is done rapidly.

The same procedure may be followed in removing healthy pulps for crown-work, only the cocain should be used first and the acid last.

The nerve-filaments in small root-canals were for eight years a source of great trouble. Arsenious acid was only food for these little fellows. Ten years ago I heard one of the best dentists in this country say he had spent a year trying to kill one of these fibrils, so as to remove it painlessly. The canals are so small that even a fine broach, before it gets near the filament, causes excruciating pain by hydrostatic pressure. I will say right here, *do not* put carbolic acid in these teeth at first. For instance, if it is a filament of pulp in the palatal root of an upper molar, treat it with an antiseptic, dry, and fill it; then place a piece of cotton with oil of cloves and aboline oil, equal parts, and seal with sandarac. After a week, open and thoroughly cleanse with warm water and $H_2O_2$. Nature will slough off the diseased part. Repeat the process until everything is thoroughly clean. Dry the root, insert the point of a fine needle, and inject cocain, or, taking one of the jewelers' broaches before referred to, gently work sulfuric acid in the root. In this way you can enlarge the canal without hurting the patient. Neutralize the sulfuric acid with soda, dry the root, and gently pump pure phenic acid into it. In a few minutes you can remove this troublesome tenant with a fine Donaldson broach, and without pain. Ice should be used in opening a highly-inflamed abscessed tooth. Bore a small hole with a thin straight *drill*, not bur; tell patient to draw gently on this opening, enlarge a little with a small enamel fissure bur, and leave for three days; you may then work as you please without hurting the patient. These are some of the methods of relieving pain. There are other things, such as injecting between teeth for separating prior to filling, and for crown- and bridge-work; use of aconite and iodin after crown-setting; getting the confidence of the patient; the use of hypnotic suggestion;

cultivating delicacy of touch, etc., all of which go to aid a man in this branch.

Fourthly, be absolutely truthful, and get the confidence of patients; and last, but not least, after making the patient thoroughly comfortable in the chair, teach him to relax every muscle.

I do not say these methods are always necessary; some teeth, so far as pain goes, can be worked upon as carelessly in the mouth as out of it. But in most cases some of these methods are necessary to insure comfort. When I have a patient who comes and asks, "Doctor, are you a painless dentist? I hear you are," I say emphatically, "No; I only try to be."

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## GOLD IN AMALGAM.

BY W. W. COON, D.D.S., ALFRED, N. Y.

(Read before the Eighth District Dental Society, Buffalo, N. Y., November 30, 1897.)

Six or eight years ago, while in an amalgam conversation with Dr. S. B. Palmer, at one of our meetings, he told me to save the excess mix of amalgam to work over and make new. When a little quantity was accumulated, to put it in a sand crucible, and drive off the mercury by heating in the coal stove, if that was the most convenient. Line the crucible with borax, sprinkle borax over the amalgam, and, imbedding the crucible in the coals, await the elimination of mercury. Then pour into ingot form, file, pass a magnet through the filings to catch the little pieces of steel from the file, bottle, temper by boiling thirty minutes, and have for use an alloy that in every respect is better than the original. All this I did, and was so pleased with the product that my scrap amalgam has been the means of giving me the best alloy I have as yet obtained. I did not repeat the process many times before commencing to put my scrap gold in the fused alloy. Finding this to improve it, not in the most expected way,—viz, in the matter of color,—but by making it tough and constant in form, I kept adding gold in increasing amount until the resulting alloy was fifteen per cent. gold.

The scrap amalgam from which this was made was Eckfeldt and Du Bois's "Standard Alloy" and Flagg's "Contour Amalgam Alloy." Let me repeat: This fifteen per cent. gold alloy is not so much better in color as it is in toughness and constancy of form, and it is these qualities that, above all others, are to be desired in an amalgam. The color would probably be perfected by the addition of a small percentage of zinc, but I believe it would lessen its toughness, and, as I have no use for a front tooth amalgam, I have not added the zinc.

To me amalgam is contraindicated anywhere that gold can be used to advantage. So my desideratum in amalgam is being approached. During Professor G. V. Black's exhibition of amalgam testing apparatus at the state society, this last May, you remember that two fillings were made in matrices, to be tested by finishing the surfaces of the plugs by burnishing in a quantity of gold foil. The plugs showed negative results, as to influence of gold in shrinkage and expansion, so far as tested. The test of time in the mouth, though, finds such finished surfaces to have a better color, and to be *tough* in contradistinction to *brittle*.

Noticing this led me several years ago to use occasionally from one-quarter to one sheet or more of No. 4 gold foil in the mix of amalgam when the mouth and *patient* indications were favorable. The addition of gold to the mix of alloy and mercury, rather than being a part of the alloy, seems to have more influence on the plug, as to color and grain. A little patience is necessary in working up the mix with much gold. Perhaps my most usual method is to place first in the mortar a section of a sheet of foil (from one-sixteenth to one-eighth of a sheet) of single thickness, sprinkling it with mercury; add alloy to its surface, and with the pestle do as much tapping as rubbing, adding foil in small pieces, mercury, and alloy as fast as the gold can be lost sight of in the mix. The process is not complete without an amount of kneading and working with the fingers, the touch easily determining when the mass is properly amalgamated.

In adding crystal gold to amalgam, it has been my practice to put in the empty mortar the whole amount of gold to be used, and to add to this at once the whole amount of mercury thought to be required to amalgamate the gold and alloy; then, adding the alloy, amalgamate the mass as usual. I have never found an amalgam alloy that was not improved in the using by the addition of gold. I have spoken of the matter occasionally to dentists, and in a few instances to manufacturers, and the usual reply has been founded on what has appeared in print,—viz, "uncertain usefulness."

The uncertainty has long since vanished from my mind, as I quite often see in the mouth of some old patient an amalgam filling that attracts attention because it is better than the others I have inserted in the same mouth, and, in looking it up in my records, find that gold is the differentiating factor.

## NITROUS OXID.

BY DR. S. C. PENNINGTON, BALTIMORE, MD.

(Read before the Union Meeting of the Maryland State Dental Association, Washington City Dental Society, and Virginia State Dental Association.)

In my practice there arises almost daily the question of safety in the administration of nitrous oxid gas as an anesthetic for extraction of teeth and for minor surgical operations.

So, without consuming your time with its history or a description of its manufacture, both of which are familiar to you, I will confine my remarks to the relation of my personal experience in its administration.

The record of our office shows that gas has been administered in round numbers 31,000 times without a single death therefrom, and only in a few cases were there alarming symptoms following its administration. In my personal experience of about 12,000 administrations I have had but one case where alarming symptoms followed. In this case the patient, a lady, took the gas comfortably, the tooth was extracted, and she returned to consciousness all right, but in a moment she became dazed, and remained so for a few minutes; her pulse and respiration were good.

I believe the trouble was largely due to hysteria. In a few moments she recovered, and no further unpleasant symptoms followed. I am aware there exists a prejudice against the use of nitrous oxid gas as an anesthetic, and, indeed, I believe some go so far as to say the danger from its administration is not confined to its immediate effects, but more remotely there is danger of systemic intoxication. While I am aware that death has followed its administration, I do believe, from my experience in the use of it, that if fresh gas is used, and proper care exercised in the administration, it is comparatively safe. I will relate a few cases to show how safely it may be given in heart-disease:

Mrs. E., the wife of a prominent physician of Baltimore, came to my office with her husband and a friend, a physician, for the purpose of having two teeth extracted. She had a history of aortic regurgitation, with dilatation of the left ventricle of the heart; she had been unable for two years to walk up-stairs; was obliged to take two drachms of tinct. strophanthus in twenty-four hours to get even comfort. We gave her gas and extracted the teeth; she came from under its influence promptly; no unpleasant effects followed.

Miss A. came with her physician to have a tooth extracted; she, also, had a history of disease of the heart. There was both hypertrophy and dilatation of the cavities, with a regurgitant murmur. Gas was administered and the tooth extracted. She recovered promptly, no unpleasant symptoms followed, and she is now in her usual health.

Miss Bessie M., with a history of acute rheumatism, with endocarditis, followed by valvular insufficiency, hypertrophy, and dilatation, shortness of breath, pain of a severe character in the precordial region, occasional attacks of angina pectoris, at times in imminent danger of dying; altogether, a most unpromising case for the administration of an anesthetic. She was given gas and her tooth extracted. She recovered promptly, as usual, and no unpleasant effects followed.

One other case I wish to relate as bearing upon the question of the safety of frequent and repeated administration of gas. This case occurred in the practice of one of our surgeons. He had operated upon an ankylosed elbow-joint for the purpose of giving motion; following the operation, it was necessary to move the joint forcibly to prevent recurrence of the trouble. This procedure was too painful to be done without an anesthetic. Gas was decided upon as best for the purpose, and we administered it for him twenty successive times in a period of six weeks; since then we have given it to the same lady three times for the extraction of teeth. She every time came from under its influence promptly, and has had no trouble from having taken it so frequently. With this experience I feel that, with care, I can safely administer gas, when necessary, to almost every case that may present. I would advise, however, in cases when there is disease of the heart, or, indeed, any disease that might cause trouble, to have a physician present, who will help in case alarming symptoms should arise, and will share the responsibility should death occur.

## ONE OF THE PRESENT NEEDS OF THE PROFESSION—A HISTORY.

BY DR. CHAS. M'MANUS, HARTFORD, CONN.

(Read before the Northeastern Dental Association, October 20, 1897.)

WE are constantly being informed—most of us—of the great value of records, not only full and accurate, but accessible, and so completely indexed that we may turn to any particular item in an instant, and thus show to the chagrined patient that the filling they calmly say has fallen out in six months had been giving satisfactory service for sixteen years.

Once in a while some statistical practitioner bobs up with a paper, the result of a carefully tabulated investigation of his record-books, and either proves (or, what is much more interesting, disproves) one of our pet theories.

As practitioners, we cannot certainly complain that we are not supplied with all sorts of books for this purpose. I think the form is quite common to state that "an accurate account of every operation is kept, which is accessible to the patient at any time." Some of these volumes are pictorial to a very great degree, necessitating almost as much skill to properly record the operation in the diagram as to perform it in the mouth. Then there are card catalogues in all styles and shapes. The very careful dentist (and, of course, all dentists are careful) occasionally presents his patients with diagrammatic records, score-cards, war maps, or whatever you may please to call them, showing exactly what he has done in their mouths,—and sometimes indicating what he may have to do,—worse luck.

All of which shows, I think, that in the conduct of his every-day work the average dentist is very careful to keep an accurate record of his operations, etc., which may at any future time be of value and interest.

This leads me to inquire what sort of a record these accurate individuals have of their profession, as a whole; and as to whether it is either full, accurate, or, what is more to the point, accessible.

Before considering this matter, let me confess at once that I have had the temerity to appear this evening with a very dull and dry subject, one that has exceedingly little, if any, practical bearing on our every-day work, and yet a subject that comes up once in a while, and then disappears again.

It has come up lately, and an effort is being made in various quarters to create interest enough in it to have a definite result this time. Let us have hopes.

The period is auspicious; this is the day of reminiscence; everybody is diligently looking up ancestors; probably the early history of our country was never so thoroughly understood as at the present time, owing to the work of some of these historical societies.

Thanks to the popular magazines, we know nearly everything about the first Napoleon, Joan of Arc, Horatio Nelson, not to mention George Washington and Abraham Lincoln.

We know a great deal more about them than they did themselves, and this is all the result of painstaking investigation on the part of a few people.

*How is it with dentistry?*

If one were asked to-day for a history of our profession, to what could one refer? To just a small, thin book of 272 pages, which is over twenty-one years old.

I refer, of course, to the admirable "History of Dental and Oral Science in America," published under the auspices of the American Academy of Dental Science, of Boston. Published as a contribution to the Centennial Exposition, it was hastily written, and the material was small in amount; and even this was collected with difficulty.

In the preface to this work it is said, "That it contains all the facts cannot be hoped, but that most of its contents will be thought worthy of a place in history; that it will prove of interest to the present generation in enlightening them as to the work of their predecessors, and that it will be of value to the future historian and essayist in directing him to sources of information; and as a preservative of the fast-vanishing facts of the earlier days of American dentistry, is fully believed."

Such as it is, it is the best we have, but it is out of date and, for all I know, out of print. Certainly I have spoken with many dentists who have never read it.

To show the general historical character of some of the earlier works, we find Fitch's "System of Dental Surgery," 1829, with a preliminary historical discourse of sixteen pages and a bibliography of some 293 works, in many languages; among which is mentioned a work by Duval, "Historical Researches on the Art of the Dentist among the Ancients," Paris, 1808.

Snell's "Practical Guide to Operations on the Teeth," London, 1831; Philadelphia, 1832, with a historical introduction of fifty-five pages,—a learned treatise in several languages, in the course of which he says, "Comparatively perfect as the art appears at present, we may reasonably hope that it will continue to participate in those important improvements which, in every department of human knowledge, are everywhere making around us."

I think that we can assure Dr. Snell that his reasonable hopes have been fulfilled to a marked degree.

Maury's "Treatise on the Dental Art," Philadelphia, 1843, has a list of three hundred authors who have written on dental science but mentioning no historical works.

In 1849 was published the well-known "Dictionary of Dental Science, Biography, Bibliography," etc., by Chapin A. Harris. It occurred to this author that much interest would be given to his work by the insertion of some brief account of the men who had been the pioneers in the advancement of dentistry, and whose genius, industry, and self-devotion he thought worthy of the grateful remembrance of the profession.

And Dr. Harris, even in 1849, says, "Owing to the difficulties the author has experienced in procuring accurate, reliable information, the biographical department is not as full as could be desired."

For some years very little new interest was taken in the subject, and I will pass over some minor matters and refer to a curious incident which occurred in 1874.

A New York publishing house announced as in course of preparation "A History of American Dentistry and Dental Surgery, comprising biographical sketches of American Dentists, with portraits on steel."

There was something which didn't sound quite right about this, and the societies began to pass "harmless" resolutions; and there were communications from a number of well-known practitioners and an editorial or two. Of course, the publishers protested, changed their plan somewhat, tried to get a few prominent men interested in the revised version, but the scheme sunk, with the book, into that oblivion which is the end eventually for all those who try to "work" the profession in their own interest. Our profession is very jealous of its honor, and no doubt objected to the portraits on steel,—thought they ought to have been on brass probably.

Many of these earlier works, some of which I have mentioned, are more closely connected with the bibliography than with the history of dentistry, and in this connection I must refer to that interesting little book by C. G. Crowley, entitled "Dental Bibliography," and published in Philadelphia in 1885. It is a reference-list to books on dentistry published throughout the world from 1536 to 1885. It contains 2047 titles, with hardly any reference to works on dental history.

When we turn to the dental periodicals, I think one is chiefly surprised by the dearth of real information they contain, aside from a few articles in the nature of recollections, occasional references to "early Etruscan" and "ancient Peruvian" dentistry; articles by Drs. J. J. R. Patrick and W. C. Barrett, about the prehistoric,—in fact, prehistoric dentistry seems to claim more attention than historic.

Naturally such volumes as the *American Journal of Dental Science*, the first dental journal in the world, having been first published in June, 1839, twenty years before the DENTAL COSMOS (1859),—such volumes are in themselves histories, but they are not really accessible; and you have to turn over a great many volumes to get at anything.

In the *New England Journal of Dentistry* for June, 1883, Dr. George H. Perine began an interesting series of articles, entitled "History of Dentistry from the Earliest Period to the Present Time," but I am not aware that it was ever completed. Dr. Perine begins at once by complaining of limited material.

A particularly valuable paper was written by the late Dr. Patrick, and printed in the *Dental Review* for July, 1889. It is entitled "The First Period in the History of Dentistry."

Passing over some short articles of no particular interest, we come to a work written in German, and called "History of Dentistry," by George P. G. Jacobi, D.M.D., of Frankfort-on-the-Main. This is a small work, and the writer says, "My history is not very detailed, I am sorry to admit. I had to remember the little interest the profession in Germany shows as to that theme; therefore I was obliged to omit many names of well-earned fame. It would be no difficult task for me to write another volume of the same size without repeating anything. Perhaps I may some day, if my little book meets with success."

But rather the most pretentious work on the subject is called "World's History and Review of Dentistry," edited, compiled, and revised by Herman Lennmalm, D.D.S., from the most reliable and authentic resources available, Chicago, 1894.

The title of this book, unfortunately, fails to explain its real character, for its contents, valuable as they are, are in no sense a history of dentistry throughout the world; neither is the book a review of that subject, but concerns itself principally with the laws enacted to govern dentistry in the various states and countries. The first part is devoted to dentistry in the United States, and gives the rise and, to some extent, the progress of the profession. This is, in the main, taken from the "History of Dental and Oral Science in America," and covers but eight pages. So I think we can dismiss this work.

But it was to the World's Columbian Dental Congress that we looked to have this long-felt want supplied.

It was said, "The very valuable report which will be made by the committee of history, with so many co-laborers, will give us a very full history, for the first time, of early dentistry in this country. This congress would be well worth its cost if no other result should come of it but this."

After a while the Transactions came along in two volumes, with a report of committee No. 18, entitled "An Abstract of the History of Dentistry in the United States," eight pages.

The chairman, Dr. Hayhurst, states, "The manuscript from which may emanate a valuable history is now in the hands of the committee, who have to pass their judgment upon it and say whether or not it is such a book as is desired for publication." The abstract, as published, simply outlines the work of the committee, and says, "Much of the former part of the work is made up from material gathered from various sources—from the pages of the *American Journal of Dental Science, Dental News Letter, Watson's Annals*, and the Dental Cosmos—for the purpose of preparing a series of papers on dental history, to be read before a society during a term of years."

And again, in referring to his material, he says, "While some of the states furnished a very full account, apparently embracing all the earlier practitioners, it is regretted that some of the states made mention of very few, and some have not a single biographical sketch in them. This is especially true of the older states, owing probably to the greater number of dentists in them, and the difficulty in finding any reliable or documentary evidence that might aid them in their researches. It would be very desirable to have had the material at hand that would have enabled the historian to make a more general narration of the settlement and establishment of our profession all over our country."

Dr. Hayhurst has an amusing reason for this, and says, "This department of the book—biography—might be almost indefinitely increased if it were not for the extreme modesty of the members of our profession, some of whom seem to experience a kind of nervous shock on seeing their names in print." This class sort of compensates for the other members who have a kind of nervous shock when they *don't* see their names in print.

There is another matter in this report which furnishes food for thought. The chairman says, "I cannot now call to mind a single state report in which there is not a claim by some individual of some important invention. And these claims are made in such a general way that had I the power or authority to investigate, or even the inclination to do so, I could not settle the claim or pronounce it either valid or void."

I had supposed that when the late Dr. Oliver Wendell Holmes wrote his pamphlet on the "Claims of Dentistry" he had covered the subject, but this paragraph puts it in a new light. The motto of these states seems to be that of the politician on election night,—"Claim everything."

Now, that's all very well, but it is the duty of our exact profession to get at and settle, if possible, some of these claims as soon as possible, or the investigator of the future will have to wrestle with tear-stained affidavits of widows and orphans, let alone the classic, if mildewed, pages of the "Encyclopedia Britannica."

At the close of the report of the committee, the editor of the Transactions added this fatal note, "An exhaustive report on the history of dentistry in the United States is in the hands of the committee on publication. The report is made up of individual reports of the various states and territories of the Union. It is to be regretted that the bulkiness of the work makes it impossible that it should be published as a part of the Transactions, and it is the hope of the committee on publication to see this report published on some similar suitable occasion, when it can be brought down to the date of publication."

The *International Dental Journal*, in reference to these Transactions, says, "There is much in them of lasting value, some papers that will live; . . . and, in one instance at least, one that should have been of deep interest, if properly prepared, is left out entirely. Allusion is here made to the 'History of Dentistry.' The editors propose that this should be published in a separate volume. This may be the best course, but unless published by individual aid it is not likely to reach library shelves."

I don't think that much may be expected of "individual aid," if we can judge of this matter by the little interest taken in the publication of the Transactions of the celebration in Philadelphia some years ago. They were to be published if one hundred and fifty subscribers could be obtained. At last accounts there were about forty, and the publication is still awaited with much interest, but little hope. The probability is, however, that all this large amount of material will be practically lost unless some effort is made to save it. Fortunately some effort is being made, and some interest has been shown in the subject lately.

Several valuable papers have been written within the past year by Dr. William H. Trueman, of Philadelphia, entitled "A Chapter in Dental History and Biography" *(International Dental Journal*, July, 1897), "The Advent of Dental Science in the United States" (DENTAL COSMOS, September, 1896). This article of ten pages covers the ground probably better than any other contribution to our early history ever published. It was suggested some time ago by Dr. Henry Burchard that Dr. Trueman ought to write a history of early dentistry in this country, and he is certainly a gentleman peculiarly qualified for the task.

At a meeting held in Washington, in December, 1895, Dr. R. Finley Hunt read a paper, entitled "Dentistry a Distinct and Independent Profession,—a position based upon undeniable historical and current facts, and not upon theories supported by arguments."

Dr. Hunt followed this paper with another (read at a union meeting held in the same city in May, 1896), entitled "The Dental Profession; Some Points in its History," etc. This paper spoke briefly of the early history and organization of the profession, and expressed the hope "that his efforts would incite others in the near future to furnish a full and complete history of dentistry."

In the discussion that followed the paper was commended, and it was stated that the history of our profession should be gathered up from where it is now scattered through our literature; and that it should be completed at as early a date as possible.

It was then moved that these societies petition the American and Southern Dental Associations to "appoint a committee of three each, these to name one or more person or persons as they deem best fitted to prepare and have published a history of dentistry to date."

In allusion to this, the DENTAL COSMOS said editorially (September, 1896), "The history of dentistry has not yet been written, but it ought to be. The time is propitious, and the longer it is delayed the more difficult it will be to secure a reliable result. An effort was made in connection with the World's Columbian Dental Congress to secure a history of American dentistry, but the result has not yet materialized. No single author could probably accomplish the task, but if a properly organized and concerted effort were made the result could no doubt be attained. Let us hope that a creditable history of dentistry, not only of America but of the whole world, may soon be forthcoming."

Last August, as you know, the American and Southern Dental Associations came together and formed what is now known as the National Dental Association, and one of the acts of that association was to pass the following resolution, offered by Dr. Hunt:

> *Resolved*, That a committee of three be appointed by the president of this association to report at the next annual meeting a measure looking to the preparation of a full history of the dental profession.

The committee was appointed, and so the matter stands.

This subject is one of real professional, if not great utilitarian, interest. Hardly any member of the profession but must admit that we are not properly honoring the great founders of dentistry, the eminent men who labored so earnestly and against such obstacles for the advancement of our calling, by allowing them to be forgotten.

It is all very well to talk eloquently once in a while, on festive occasions, about Hayden and Harris, Maynard, Gardette, Greenwood, the Parmlys, and Flaggs,—not forgetting the dental poet, Solyman Brown. It is easy to weave laurel wreaths with our lips, but if we leave their memories to the tender mercies of the back numbers of various old magazines, we must not blame the coming generation—that sensitive plant—if it promptly declines (as it will) to dig very deep through the dust after them. There are too many of the younger dentists to-day who have but a vague idea of the glorious history of our profession and of the great men of the past,—"for there were giants in those days;" and without an accessible history, what can we hope for the future? The work must be done before the present generation fades away,—before this century closes. For, as Dr. Francis, of New York, said the other day, "If it isn't done soon it never will be."

I have spoken more particularly of the value of the records of the early days, and of the organization of the profession. When we come to the associations, journals, colleges, and legislation we have gradually increasing data, and all that it requires is that it be compiled and edited by the men best fitted for each subject; for, of course, it is not expected that one man can write the entire work; it needs a corps of writers as much as any of the other modern dental works.

For much of the work we will have to depend for advice and help on the older and more experienced men in the profession; those that have always done so much will have their perquisite of doing more. But it is a subject deserving of the heartiest interest of *all* the thinking members of the profession.

Monumental works on "Operative and Prosthetic Dentistry" and "Oral Surgery" have been recently published. There are, in fact, many new, complete, and valuable works on all the departments of dentistry. Isn't it about time we had a published history worthy of the name?

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## VISUAL DEFECTS OF DENTISTS.

BY DAVID W. WELLS, M.D., BOSTON, MASS.

(Read before the Northeastern Dental Association, October 20, 1897.)

SINCE accepting the invitation to address you I have made an investigation of my case books for the last five years, in order to discover what particular optical defects are found with the eyes of dentists.

It has been my good fortune to number among my patients quite a percentage of dentists, and I have taken considerable pains to classify the records of these cases and work out the percentages of the different refractive errors. The results are as follows:

Simple near sight, .02; simple far sight, .02½; simple disturbance of the ocular balance,—that is, of the muscles which move the eyeballs,—.06; far-sighted astigmatism and astigmatism combined with far sight, .32; near-sighted astigmatism and astigmatism combined with near sight, .54; astigmatism with disturbance of muscles which move the eyes, .40. All these patients have sought help for some uncomfortable symptoms, and, of course, it would be very impolite of you to suspect that in any case the correction of these errors failed to give relief; and this *must* be conceded to substantiate the deductions hereinafter drawn.

Notice first the small number in whom far or near sight *alone*, without other error, was present (two and a half and two per cent.), and even the *comparatively* small proportion of lack of harmonious motion of the two eyes, unaccompanied by other defect, six per cent.

But *what are* those troubles which run up respectively to thirty-two, fifty-four, and forty per cent.? One trouble obtrusively prominent in these cases is astigmatism. Like an octopus, it clings to far sight at the rate of thirty-two per cent., and entwines itself about binocular disturbances in forty per cent. of the cases; and drags down the near sights in more than half the cases,—viz, fifty-four per cent. Let me explain that these figures amount in all to more than one hundred per cent., because this arrangement puts *some* cases into more than one class. Before making this classification and study, I had thought and *argued* that simple disturbance of the ocular muscles for turning the eyes was the prevailing complaint of your profession, and *with astigmatism* it *is* very prominent —forty per cent.

The position you assume in working over a patient is certainly a very unnatural one, and from the oblique poise of the head would seem, *a priori*, to be peculiarly liable to disturb the binocular balance; the reason for which will be given later. So from this investigation the visual defects of dentists are found to be astigmatism and unbalanced ocular muscles; and although of the latter idiopathic cases exist, probably one-half are second to astigmatism. This prominence of astigmatism as a cause of eye-strain is in accord with the findings of other observers, under all conditions where the eyes are taxed.

Dr. Risley, of Philadelphia, has made diligent and extensive examination of the school-children of his city, this critical oversight extending over a series of years. His object was to discover the cause of the well-known development and increase of near sight during the school years; and after experimenting with the most perfect hygienic arrangement attainable, like ventilation, correct entrance of light from left and rear, and adaptation of the height of the desk to the individual scholar, still the near sight increased in about the same proportion as before. But on further analysis of the records it was found that almost none of the eyes which were free from astigmatism developed near-sightedness; and, working upon this clue, he corrected the astigmatism of other beginners with proper glasses, and the increase of near sight was very decidedly checked. So he makes the bold assertion that "astigmatism is the turnstile through which near sight enters the school-room."

So our inquiry seems to resolve itself, first, into a consideration of the subject of astigmatism; and it is only within recent years that we oculists have appreciated how slight an amount may be productive of severe local and reflex disturbances. In fact, the lower degrees cause more trouble than the higher. The reason of this seems to be that the eye instinctively demands a clear image, and if the error be one which the accommodation muscle can overcome by excessive and contorted contractions, it will have the clear image. But nervous force thus extravagantly wasted is a serious draft upon the general store of energy.

This explains why one's vision may be up to the average, and yet eye-strain in a serious form exist. But if the astigmatism is beyond the power of the lens muscle to correct, these attempts are not made, and the patient may get along very comfortably, but with greatly reduced vision.

But with the slight error, sight is obtained by main strength and —shall I say stupidness? Certainly, if the "means of grace" are known and neglected.

Astigmatism was first carefully described by Thomas Young in 1800, and it is now known, at least by name, to most professional men and to many of the laity; but to understand its potent influence for ill requires a clear knowledge of what it really is.

The word is derived from Gr. *stigma*, a mark or point, and *a* —not literally; not a point; that is, by a tilting of the lens or the spheroidal shape of the cornea, a departure from the true spherical curve in some meridian, a luminous point is not reproduced as a point, but elongated into a line at the angle of the defective meridian. Horizontal and vertical lines cannot be clearly in focus at the same time, and as letters and objects are distinguished by the lines that bound them, the accommodation plays a sort of "see-saw," alternately focusing lines in different directions until the object is seen.

In the lower degrees the crystalline lens is often contorted to overcome the difficulty.

The normal eye when focused for vertical is also focused for horizontal and oblique lines; and so, when reading a flat page, the focusing need be done but once and maintained throughout the page.

In contrast with this, is it strange that the unnatural continuous focusing required of the astigmatic eye should derange the nervous system?

The symptoms may be local or remote. When we "cut in" (as the electrician calls it) to the circuit of our nervous system, the resulting disturbance may be anywhere along the line, presumably at some weak point; so the symptoms of an eye-strain may be pain or inflammation in the eye itself, or neuralgic headache, frontal or vertical, insomnia, gastric disturbance, chorea, migraine, and vertigo.

Of course, you are all aware that in this way carious teeth may cause neuralgia of the ophthalmic branch of the trifacial, but I am inclined to think that this condition as a factor in the etiology is rare. I have seen a number of cases where, in desperation, all of the teeth have been extracted,—sound ones, too,—and, neuralgia still persisting, permanent relief has been afforded by glasses correcting a slight astigmatism. So just a word of caution in these cases: Be positive there is no uncorrected astigmatism. As before mentioned, vision may be up to or even beyond the normal. With a persistent neuralgia in or about the eye, and no manifest refractive error, the paralyzing of the accommodation with a mydriatic should never be omitted, lest some *latent* trouble be passed over.

Sub-occipital headache at the so-called "base of the brain" is almost always pathognomonic of some defect in the binocular vision; but we will dispose of one eye first.

In contrast with this astigmatic eye, the perfect eye may be described as one in which a luminous point is reproduced as a point on the retina, and a clear conception of this fact would have relieved the physiologists from their unsuccessful attempts at explaining how we see things right side up when the image on the retina is inverted. The discovery of this image on the retina, the similarity between the eye and a photographic camera, has been a stumbling block to the majority, and I have yet to find a single text-book that is trustworthy on this subject. They have all fallen into the error of thinking that we look at the image on the retina, when in reality we look at the object itself.

The great physiologist, Michael Foster, who is just now affording us such a treat in his Lowell Institute course on the brain, gives the following: "As a matter of fact, the field of vision, in one important particular, does not correspond to the field of external objects. The image is inverted. The rays of light proceeding from an object which by touch we know to be on what we call our right hand, fall on the left hand side of the retina. If, therefore, the field of vision corresponded to the retinal image, the object would be seen on the left hand. We, however, see it on the right hand, because we invariably associate right hand tactile localization with left hand visual sensation. That is to say, the field of vision, when interpreted by touch, is a reinversion of the retinal image."

Martin, in his work on "The Human Body," says, "A newborn child, even supposing it could use its muscles perfectly, could not seize a reachable object which it saw. It would not yet have learned that attaining a point exciting that part of the retina above the fovea (center) meant reaching a position in space below the visual axis; but very soon it learns that things near its brow, that is, up, excite certain visual sensations, and objects below its eyes others; and learns to interpret retinal stimuli, so as to localize accurately the directions with reference to its eyes of outer objects, and never henceforth gets puzzled by retinal inversion."

These two statements are fairly representative, and although clear and lucid, are, I think I can prove to you, not only inadequate, but erroneous.

*First.* This reversal by one sense, the tactile, of the testimony of the outer world, as given by another sense, the visual, is not analogous with the other special senses; and during the learning lapses would occur, and pathology would furnish instances of mistakes.

*Second.* Certain forms of congenital blindness, such as cataracts and complete closure of the pupil, can be remedied by operation. These children learn by touch the correct (erect) position of objects, and their first impression when sight is restored would be an inversion of the object, according to the current theory. Nothing of this sort has ever, so far as I can find, been recorded.

The case of a very bright child of six, with congenital cataracts, came under my observation, and I questioned her very persistently about what she saw when the bandage was removed; and she was so amused at the suggestion of "seeing things upside down" that it took a good deal of reassurance to convince her that I was not fooling, but in earnest.

*Third.* This is a misconception, based on the old theory of special immediate creation of perfected organisms, and finds no place in the scientific thought of to-day. It is inconsistent with the facts of evolution, which means a regular progression from the simple to the relatively complex; and the explanation of the phenomena of sight must cover the primitive eye, as well as the perfected organ.

The study of embryology has shown that the eye develops as an offshoot from the first cerebral vesicle, and when it reaches the surface is little more than a pigment spot, with a layer of epithelium.

The function of such an eye could have been simply sensitiveness to light, and the implication of the law of natural selection, that every minute change which was continued was of greater advantage to its possessor than a preceding stage, absolutely excludes the "tactile reinversion theory." For the specialization of a sense organ in such a way that its evidence of the outer world was misleading (inverted) until corrected (reinverted) by some other sense organ (touch), could not have been of more advantage to its possessor than a less highly developed organ which could be trusted; and natural selection would have carefully avoided propagating any such variation.

The inversion is an accomplished fact as soon as the primitive eye is able to locate an external point in space, for it can never see the point till it can tell its direction; so there can be no sight beyond mere sensitiveness to light without estimation of direction.

The subsequent changes are all along this line of so perfecting the mechanism that a luminous point in space shall produce an irritant point on the retina. Thus there is no break in the contemporaneous development of the organ of seeing and the psychical act of seeing. They advance with equal step. There is no catastrophe; no period when the optical apparatus gives wrong impressions to the sensory. All organs of special sensation are simply so many doorways opening into special apartments (departments) of the external world, and so very aptly that intensity of stimulus just sufficient to call forth a sensation is called the threshold.

All nerves of special sense differ from nerves of common sensation only in the differentiation and adaptation of their end organs to the particular stimuli of their respective external realities.

Although Emerson says that "thought is the property of him who can entertain it and of him who can adequately place it," yet I am pleased to acknowledge my indebtedness to Professor Le Conte, of California; Dr. Dennett, of New York, and J. Clark Maxwell, of England, for the three thoughts of the conjugate foci, outward projection, and the composite image.

A cone of light emitted by a radiant point falling on a convex refracting surface is again converged to a point behind the refracting surface. These two points are called conjugate foci (literally yoked together), because the radiant placed at either focus will be brought to a point at the other focus.

In the normal eye, at rest, a luminous point twenty feet or more distant is focused as a point on the retina. If the luminous point be nearer than twenty feet, the refracting or bending effect of the eye must be increased (accommodated) so that the conjugate focus shall still be at the retina. As before stated, when the eye is able to reproduce a luminous point in space as an irritant point on the retina, the optical requirements for perfect vision are secured. Now "outward projection" means that the retina is touched at this mathematical point, and, like all other senses, it refers the sensation back to the source; in this case along the central line of the pencil of rays. The size of the image on the retina of the largest object that can be seen at one time without moving the eye or the object is three millimeters.

Conversely, the field of vision—of clear vision—with an immovable eye is extremely limited. At the length of the arm a circle, the size of the thumb-nail, represents all that can be seen clearly, and it is only by rapid excursions that the eye sees in detail those portions that were only outlined before. The field of vision has been compared to a painting which is hazy and indistinct except a circle one-half inch in diameter, in which the most minute details are worked out. This small area may be any portion of the picture which is desired, by turning the eye toward that spot, but no two places at once. It is hard to believe this, for the eye, by rapid excursions, so quickly covers a large field that the separate sensations are fused into one.

Now, the analogy and bearing of this is important when it is understood that we do not see even this one-half inch object as a whole. Each mathematical point of which the object is composed sends out its bundle of rays, which are again converged to a point upon the retina, and from this irritation conveyed to the brain; sensation (sight) results, which refers the irritant right back along the ray-line of each point to its source. So point after point irritates the retina, and is referred to its appropriate place in space until the luminous object is reproduced in the external world by the outward projection of an infinite number of luminous points.

To make this clear, a very simple object should be used; let it be a vertical line. Now a luminous point at the top of this line produces an irritant point at the lower side of the retina, which is referred back to its source above and seen then in space.

A luminous point at the bottom of this line produces an irritant point on the upper side of the retina, and is referred back to its position in space, which is below. A point from the center is referred back to its place in the center for the same reason. And so with a point midway from the center to the top, and a point midway from the center to the bottom; and the process goes on simultaneously for each point of which the line is composed, and a sort of mental composite results, which is the exact counterpart of the object, occupying the identical position in space; somewhat as the spiritual body is conceived to be immanent in the natural body.

To recapitulate: By the law of conjugate foci a luminous point in space corresponds to an irritant point on the retina. By the law of outward projection it is referred to its proper place in the object, and, as the object is not seen as a whole, an infinite number of such luminous points of which the object is composed are referred to their respective positions, and furnish a synthetic conception, which must be erect because each of its constituent points is in its place.

If I have dwelt at some length on the necessity of the eye being able to reproduce points, it may serve to explain the blurring that exists in far- and near-sightedness, where the eye is either too long or too short, and is therefore out of focus; and what should be focal points of light are, instead, diffusion circles. But especially should it emphasize the trouble that may arise in that "not a point" condition, astigmatism, when innumerable mathematical points may produce a clear line in one direction, while in the opposite meridian diffusion circles are overlapping, forming a blurred line.

So far we have spoken only of the single eye, but we have two eyes instead of one, for a very important reason; that is, for the estimation of distance. To be sure, this can be done to a certain extent with a single eye, but all of us who have had occasion to pick up instruments with one eye engaged have no doubt about the advantage of binocular vision.

The process is interesting from its analogy to the technique of surveying. The base line is the distance between the two eyes, and this factor remains a constant. Now, at either end of this base line is set up a surveying instrument, which measures the angle of the object with the base line; so the problem resolves itself into, "Given two angles of a triangle and the included side," which we solve by a lightning process. So long as the eyes are so directed that the retinal images fall upon corresponding areas, the external projections are superimposed and there results a single impression, with the third dimension depth added to the previously flat picture.

This is the principle of stereoscopic pictures; the photographs are taken from either end of the base line, and the stereoscope is simply a contrivance of lenses to superimpose the two. This balance is maintained by a nice adjustment of the six external muscles of each eye; but if either eye deviate slightly one image no longer exactly covers the other, and a blurring, or even double vision, results.

This does not mean that one is "cross-eyed," for when that stage is reached binocular vision no longer exists; one eye is completely ignored and its image not noticed. But it is the slight error, the wrong tendency, of which the instinct for clear vision demands the correction, which gives rise to the unpleasant symptoms; and these may be of almost any degree of severity, and may be either local or remote; but, as before stated, dull, constant sub-occipital headache is seldom lacking.

The prevalence of astigmatism with disturbance of ocular balance, in forty per cent. of the cases analyzed, would certainly suggest a causative relation between the two; and this is easily explained when it is remembered that the act of focusing each eye for a near object, and the act of converging the two eyes till they both point toward the same near point, are necessarily associated. Both sets of muscles, the ciliary, which do the accommodating, and the internal recti, which do the converging, receive their motor fibers from the same third nerve.

Normally, both muscles contract at the same time, and so, like a pair of horses, when one is called on, both respond; but with the gymnastic efforts of the ciliary to correct astigmatism the convergence muscle can do nothing but "prance," as pulling would give double images.

That astigmatism induces disturbance of these convergence muscles is no mere theory, for where they co-exist, and the astigmatism alone is corrected, the binocular error either disappears entirely or is so much lessened that a prism of less strength than that first indicated suffices to give relief.

That this "outward projection" is analogous to the law of direction and outward projection of other nerves may need some illustrations. The well-known fact that animals which have muscles for moving the auricle turn the ear toward the source of the sound is evidence that they appreciate the direction of that sound and adjust the receptive apparatus to a more advantageous position with reference to the sonorous body.

A very simple experiment will convince one of this outward reference to its source of a tactile irritant. Touch the cheek of a blindfolded person with a pencil; then vary the direction of the pencil, but make contact at the same point. A difference of thirty degrees is easily recognized, and the irritant referred along the line of the pencil toward some familiar object across the room; the irritated nerve reaches out for the source.

The familiar tingling of the last phalanx of the little finger from an irritation of the ulnar nerve at the elbow is another attempt.

Commencing with nerves of common sensation, it should be noted that immediate contact is necessary,—the thing must be touched; and in the lowest of special senses, taste, the thing must be touched, and touched intimately,—it must be soluble.

Smell is one step higher; here finely-divided particles of matter are brought from a distance by the medium of the atmosphere, and touch the nasal mucous membrane; and reference is made through the connecting medium, the air, to the source.

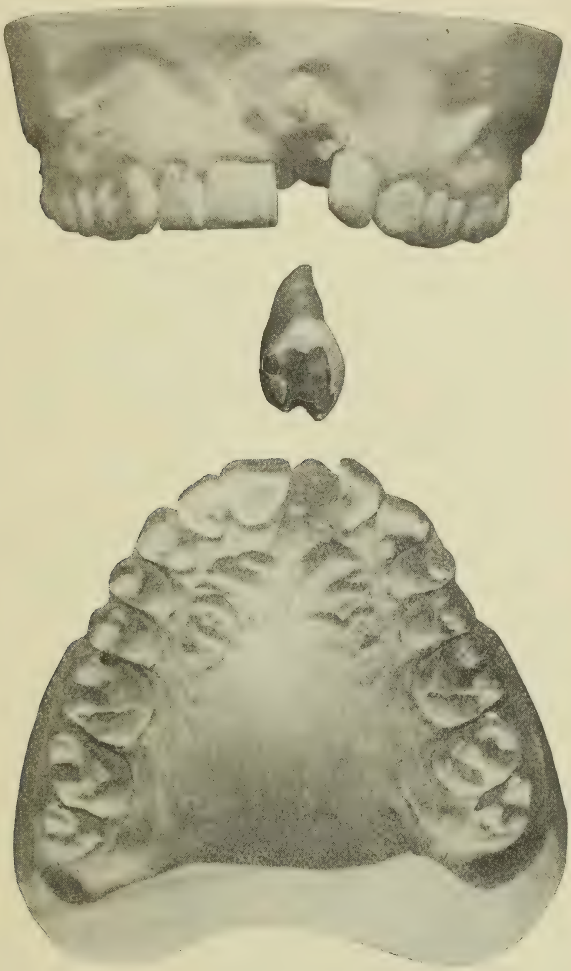
Hearing is another great step; the tympanic membrane is touched by the vibrations of air caused by the sonorous body. These vibrations are borne along by the conducting apparatus till the special nerve, the organ of Corti, is touched, and the sound is referred back through the lymph and ossicles to the drum, and thence back through the air toward the source, or sonorous body. Since Newton, scientists have recognized that for one body to act upon another at a distance, some medium must intervene. So with sight, the provisional ether is that intermediate something which reaches from the luminous point and "touches" the retina. The unlimited extent of the ether gives to sight unlimited range, and, although light travels one hundred and eighty-six thousand miles per second, it takes three and a half years for light to reach us from the nearest star.

The light which reaches us to-day from some of the more distant stars left them before America was discovered; before Jesus was born; before the pyramids were built, and, for all we should be able to see, they may have ceased to exist long ago, though their light still shines.

# A DENTAL ANOMALY.

BY V. WALTER GILBERT, D.D.S., PHILADELPHIA, PA.

A few months ago a young man, twenty-three years of age, applied for advice in regard to a bony formation growing between the upper right central and left lateral incisors. Upon making an examination, the formation appeared to be covered with enamel, and partook of the form of a molar tooth, and was lodged very firmly in the alveolus. On making inquiry into the history of the growth, the patient stated that before it made its appearance an upper left central had occupied the space, but it had been extracted.



The history of the extraction was as follows: The tooth had become so loose that the patient tried to extract it himself, but had failed; he then presented himself to a dentist, who failed in his first three or four attempts, but finally succeeded in removing it.

Shortly after the tooth was extracted the growth alluded to made its appearance. The patient was advised to have the growth removed, which he did, and it was found to be a malformed tooth, presumably a malformed follicle of the permanent left central. The tooth which was previously extracted was in all probability the deciduous incisor, and had been firmly attached to the malformed permanent tooth.

The illustrations are from photographs, and give a clear idea of the appearances presented by the malformation and the contiguous parts.

# CORRESPONDENCE.

## THE SPELLING OF SCIENTIFIC TERMS.

TO THE EDITOR OF THE DENTAL COSMOS:

*Sir*,—In the October (1897) number of the DENTAL COSMOS there is printed an address by Dr. J. S. Cassidy, which was delivered before the American Dental Association, August 4, 1897.

In the paragraph before the last he says, "We have been surfeited for a long time with cocain hydrochlorate, and lately with eucain hydrochlorate; although a generation ago it was decided that acids like hydrochloric, hydrobromic, etc., whose electro-negative radicals are elementary, confer names on salts which terminate in *ide*," etc.

Now, the above statement is true in regard to other than the alkaloidal salts; but these salts, formed by an alkaloid and such an acid as hydrochloric, hydrobromic, etc., have been and are written to-day by first-class authorities, hydrochlor*ate*, hydrobrom*ate*, etc.

The last revision of the "United States Pharmacopœia," which went into effect January 1, 1894, and which is recognized by physicians and dentists of the United States as a standard authority, and was revised and published by a committee composed of twenty-six able scientific men, has the termination *ate*,—*e.g.*, cocain hydrochlor*ate*. In "Squibb's Ephemeris" we find it cocain hydrochlor*ate*; also, in "Simon's Manual of Chemistry," the last (fifth) edition, recently published, and in "Watt's Dictionary of Chemistry," it is written cocain hydrochlor*ate*, morphin hydrobrom*ate*, etc.

Therefore, it is hardly correct to claim that only unscientific writers have been writing the termination *ate* for the past generation.

Of course, the alkaline salts, metallic salts, etc., which are formed by the halogen acids, have the termination *ide*,—*e.g.*, sodium chlor*ide*,—but with the alkaloids it is different, because, in the first place, alkaloidal salts are formed differently,—*i.e.*, the salt is formed by the direct combination of the alkaloid with the acid, the H of the acid not being displaced as it is when it forms an alkaline or metallic salt.

Some scientific writers defend the termination *ate* and others the *ide,* and possibly a majority defend the latter; but that is not the point I am criticising. What I do maintain is that a writer is not obsolete, nor is he a generation behind the times, when he writes cocain hydrochlor*ate,* but, instead, is writing properly and in conformity with the "United States Pharmacopœia."

It is customary, in writing, to have some recognized authority for reference, and nearly all doctors and dentists refer to the "Pharmacopœia"—which is proper—as the standard authority in chemical tests, formulæ, nomenclature, etc., the same as in ordinary writing a large majority refer to "Webster" or the "Century Dictionary" for their authority in orthography, nomenclature, etc.; and if a writer writes programme with the final *me,* and has for his authority "Webster," he is writing the word correctly, notwithstanding the fact that the new school in nomenclature write it program, and maintain that their termination is correct.

In regard to the final *e* in chemical nomenclature, a writer may, if he prefers, adopt the nomenclature of the American Association for the Advancement of Science, and write thus,—*e.g.*, potassium iodid; but if he sees fit to write it potassium iodid*e*, as written by the "United States Pharmacopœia," he is writing correctly and according to a recognized authority.

Respectfully,
G. B. SQUIRES, PH.G.

113 CAMBRIDGE STREET, BOSTON, MASS.

# PROCEEDINGS OF SOCIETIES.

## NORTHEASTERN DENTAL ASSOCIATION.

THE third annual meeting of the Northeastern Dental Association was held in the Warren Chambers, Boston, Mass., Wednesday and Thursday, October 20 and 21, 1897.

### FIRST DAY—*Morning Session.*

The morning session was devoted to reading the records of the last annual meeting and reports of committees.

### *Afternoon Session.*

The association was called to order at 2.30 P.M., and Dr. J. H. DALY, the president, read his annual address. In the course of his address, Dr. Daly said, "The value of associations of professional men such as ours is beyond computation. As careful as may be the student, as conscientious and thorough the practitioner, he can scarcely reach the highest results without a comparison with the studies and experiments of others. Through these associations, therefore, we may ourselves more easily attain desired results, while we, at the same time, by a mutual interchange of ideas, opinions, and discoveries, disseminate useful knowledge throughout the profession. It is the selfish idea that we, each of us, has engaged in the profession of dental surgery only for the purpose of making a living for ourselves and to support our families. There is a broader and a more generous thought than this, and one which appeals to our better nature,—the thought that through us civilization is advanced, human suffering lessened, and life made more enjoyable and happy. It therefore behooves us, as members of this association, to do all that we may to advance its interests and to contribute to its growth, its success, and its prosperity.

"There are a few considerations to which I beg leave to draw your attention before we enter upon the serious work of this session, and, first, the importance which attaches to the prosecution of a specialty in our profession. It is true that the majority of dentists, from the nature of things, must be general practitioners. But comparatively few of us are located in the great centers, where the follower of a specialty, and of that exclusively, is able to make a livelihood for himself and for those dependent upon him. The practitioner in the lesser cities and towns, the country through, must, in a general way, be able to meet the demands of such patients as may come to him, in the varied ways in which their needs present themselves. But yet, varied as may be these demands, there is still time and opportunity to make a special study of some one point of practice and to struggle onward toward perfection in it. There are problems in dental study, in the solution of which lies deliverance for humanity from some extraordinary ill. In such solution is not only advancement of science, but sure professional success, if not fame, for the discoverer. The adoption of a specialty, then, not only does not interfere with the dentist in general practice, but it leads the student into higher lights and broader paths, wherein lies human success.

"Again, let me urge that none of us shall hesitate to communicate to our fellows the best results of our studies and researches. It is by such communications and consultations that, at times, the highest thoughts are reached. The brain, befogged by technicalities, fallen, it may be, into well-worn ruts of argument and philosophy, is, by contact with other less potent organisms, often bestirred into fresh life and new activity or turned into unsuspected by-ways, which ofttimes prove the shortest road to the long-sought goal. So may we, by a free interchange among one another of the results of our study in special lines, achieve some results which will at once benefit humanity and win fame for ourselves. Let us each strive to add something to the sum of human knowledge and so add to human happiness, even as does he who makes two blades of grass grow where grew but one before.

"While the social feature of these annual gatherings should be by no means ignored, or its value depreciated, it should not be forgotten that an increase in professional knowledge is their chief function. To this end, it does not seem necessary to urge upon all a close attendance upon technical discussions and clinics. I should not omit, however, to suggest the prime necessity of imparting, by paper, by discussion, debate, or by demonstration, any valuable professional information which may have been acquired during the year. It is only by the fullest and freest discussion, and by a willingness, even an eagerness, to communicate the results of thought, study, and experiment, that our association will attain its highest usefulness."

Dr. F. S. BELYEA, Brookline, Mass., presented the following:

### SYMPOSIUM: SUBJECT, "TREATMENT OF CARIOUS APPROXIMAL SURFACES IN BICUSPIDS AND MOLARS.

Dr. Belyea had sent the following questions to the dentists whose replies follow:

(*a*) How would you treat carious approximal surfaces on bicuspids and molars?

(*b*) How shape the cavities? Would you conserve or sacrifice tooth-substance, and to what extent?

(*c*) What materials would you use in filling?

(*d*) Would you use a matrix; if so, what kind? If not, state your objection.

Dr. CHAS. L. JOHNSON, Pittsfield. (*a*) If the carious surfaces were very sensitive, or the dentin soft, I would adjust the rubber-dam, dry to a reasonable degree with hot air, remove the decay and fill with a mixture of oxyphosphate two-thirds, and hydronaphthol one-third, for six months or so.

If the tooth was reasonably hard and not too sensitive, I would insert a permanent filling without further treatment.

(*b*) I would make the cavity occlusal as well as mesial or distal; would cut the vertical walls back to such a position that the juncture of the filling and enamel edges would be kept clean by the natural motion of the tongue and cheeks; would cut the cervical wall down to such a position that the juncture of filling and enamel would be overlapped by the gum.

(*c*) I believe the most permanent and best filling to be made by using tin and gold for a cervical border; if the cavity is very deep, would put in a capping of oxyphosphate two-thirds, and hydronaphthol one-third, completing the filling with gold foil, contoured to as near the natural shape of the tooth as possible.

(*d*) I believe in the use of a matrix, and like the double screw matrix designed by Dr. W. A. Woodward.

Dr. WILLIAM BARKER. (*a*) The age and sex of the patient, as well as the character of the teeth,—*i.e.*, whether soft, deficient in mineral constituents, hard and dense, or friable and brittle,—would all be factors to be considered in determining the treatment of the cavities under consideration. Speaking generally and briefly, in such cavities in the mouths of patients under twenty-two or twenty-three years, unless teeth of the first class with a good inheritance behind them, or in small cavities, alloys containing some copper, gutta-perchas, and zinc phosphates would be employed. Very little gold should be employed in these cases, the expectation being entertained that at the age above indicated the teeth would have become sufficiently organized to wisely admit gold to replace the other.

(*b*) A hard question to answer intelligently on paper without the use of diagrams. Where zinc phosphates are employed or gutta-perchas (under which a good antiseptic and adhesive varnish should be used), tooth-structures should be sacrificed very sparingly. When metallic fillings are demanded, cavities should be so shaped as to mechanically retain the filling without the use of "pot-leg" retaining points, dovetailing in briefest term. Margins should be cut back to form strong ground, and contour be as fully restored as possible.

*(c)* As stated in answer to *(a)*, any material best calculated to preserve the tooth. No one material meets all requirements, and so far as I know there is no class of filling-materials which, intelligently employed, may not be useful in preserving teeth.

*(d)* Where I had ample room I would not employ the matrix; the percentage of such cases is not large. I prefer a band matrix as a rule. I make them myself: a simple strip of metal, copper, silver-plated on one side, cut to proper width and long enough to embrace the tooth inside of the two holes, one at each end. Through these holes a small bolt or screw is passed, and with a nut on one end the band may be made to embrace the tooth as tightly as desirable.

Dr. Geo. C. Ainsworth. You know my methods so well that I deem it unnecessary to go into detail. The article of Dr. C. N. Johnson on cavity formation is well written and worthy of careful attention. I might differ slightly with him in discussions, but not much. As for filling, soft gold or tin and gold at the cervical wall, then the major part of the filling soft-working cylinders, annealed to be inserted by hand-pressure and finished with cohesive gold and the mallet. I have used lately, in place of the latter, Dr. DeTrey's solila gold, completing the whole filling with hand-pressure, with much satisfaction, but I do not have, as yet, perfect confidence. If this latter stands as well as it looks it will be a great addition to both operator's and patient's comfort, doing away almost entirely with the malleting so trying in many cases.

Dr. J. W. Rider, Danbury, Conn. (*a*) I should separate thoroughly for filling.

(*b*) I am conservative in my treatment of tooth-substance, removing, of course, all defective enamel, but do not believe in sacrificing, providing always that firm and well-supported margins can be gotten. A mere opinion is, as a rule, unsatisfactory. My reason is that with the original point of decay removed and replaced with a well-contoured filling,—*i.e.*, a filling compatible with normal shape and condition of the tooth,—the danger of a future attack is not sufficient in at least ninety per cent. of cases to warrant sacrificing unnecessarily any sound tooth-substance; certainly not in the promiscuous robbery advised by some at the present time, mistaking I think the advice given by Dr. G. V. Black.

(*c*) Should be that material that in the judgment of the operator would prove the best conservator. I should use gold wherever the conditions warrant it, next to gold amalgam, etc.

(*d*) The matrix, in my opinion, is universally a "delusion and a snare." In the hands of the incompetent and careless operator it is certainly a vile and treacherous contrivance, while to the competent it is practically useless.

Dr. J. G. W. WERNER, Boston. (*a*) Always restore carious approximal surfaces in molars and bicuspids to full, or, in many cases better yet, to a little more than full contour.

(*b*) Flat base, cervical wall beveled, lingual and buccal walls beveled with little or no undercut or grooves, an anchorage step, and in all but the best teeth rather sacrifice than conserve tooth-substance.

(*c*) Would use gold,—soft gold at the neck and all but the last or occluding portion, where I would use gold and platinum and in some cases gold and tin at the cervix.

(*d*) Would use a steel matrix.

Dr. R. OTTOLENGUI, New York. The subject of your symposium is one upon which a book might be written; and as I cannot take the time to write a book, and as your society would probably not be gratified at receiving so lengthy a communication, I shall only say that in the treatment of cavities in the approximal surfaces of bicuspids and molars I would follow the same rules that I do in similar cavities of any of the other teeth.

I get the teeth into a healthy condition, and fill them with gold, restoring the contour, and so shape the fillings that no food may be lodged between and there retained.

For these fillings I use cohesive gold, at least the latter half of the cavity being filled with heavy foil introduced by the electric mallet or engine mallet.

Dr. G. A. BOWERS, Nashua, N. H. I shall include only the upper bicuspids in my reply. A similar treatment, however, answers for the lower bicuspids and all molars. The upper bicuspids are the most vulnerable teeth of the permanent denture. I fancy seventy-five per cent. of the operative procedures are performed on these teeth. Owing to faulty manipulative skill or a lack of conscientious treatment early in life on the part of the dentist, they are either sacrificed or covered with a crown, and generally a gold crown. Frequent examinations, conservative treatment, and conscientious work must be the rule from their eruption. If they are early prone to decay they should be filled with cement or gutta-percha. Watch them closely, renewing the fillings if necessary until the patient is about twenty. At this age if they are of good structure they can be permanently filled, and in doing this an opportunity is afforded the dentist of exhibiting his most artistic skill. When a bicuspid is artistically filled, bringing out the beautiful lines and contour, it is a sure criterion of a good dentist.

In the cavity preparation use the chisel freely, never hesitating at sacrificing tooth-structure to accomplish your desired result. Extend the cavity cervically, and beveling so that the gum will come down over the finished filling. The seat of the cavity should be practically flat, with the buccal and palatal grooves extending and rounding into it. A wedge-shaped retention is supplemented in the sulci. Finally, see that your margins are well defined and sharp. A good chisel will do this. Do not use strips or disks, for you will invariably get a rounded edge, and therefore a slivering of the gold at that point. I should always use gold if I could get my pay for it.

I think it is perfectly safe and good practice to use a matrix. I almost always, however, fill the cervix, first burnishing and finishing it. Then apply the matrix and complete the filling. I use Woodward's matrices more than any other, numbers 6, 7, and 8. For special cases where these are not suitable, I cut them out of matrix metal and contour them. They can be kept in position with a clamp or orange wood.

Dr. C. N. JOHNSON, Chicago. (*a*) and (*b*) are given in some detail in a recent paper read by me before the Kansas State Dental Society and published in the May issue of the *Western Dental Journal.* They got some of the cuts upside down, and to rectify this the *Dental Digest* is reprinting it in the July issue. I should esteem it a favor if you would examine this article and have the subject discussed before your society. The illustrations emphasize concisely the ideas advanced in the paper.

(*c*) My preference is for gold wherever it can be used. Other materials are simply used as expedients, and with a full sense of their limitations. If they last well it is exceptional, and due to the exceptional causes.

(*d*) I would ordinarily use a matrix on distal cavities. Use a thin matrix sufficiently yielding to be readily sprung away from the cavity margins so as to admit of carrying the gold between the enamel margin and the matrix.

Dr. HENRY A. BAKER, Boston. (*a*) In the deciduous teeth I would make a broad V with a corundum wheel, grinding back one-third upon molar crowns with the point of contact near the gum. If any cavity should exist after this treatment, I would fill with amalgam or gutta-percha, using a flat surface flush with the V; this makes them self-cleansing. Permanent teeth I would treat quite differently; I would restore them with contour fillings.

(*b*) First I would get good separation, then shape the cavities with a rounded periphery nearly or quite to the gum. Approximo-lingually and approximo-buccally I would sacrifice tooth-substance to the extent that the above surfaces could not come in contact to within one-sixteenth of an inch after filling. In second quality teeth or young subjects I would fill three-fourths full with tin, then using No. 30 rolled gold, finishing the surface with platinum or rolled gold well malleted and burnished, being careful to have the platinum and gold in layers one upon the other like leaves of a book, thus preventing pitting. The fillings should be well rounded, approximating each other like two curved surfaces with point of contact as we find it in nature, with a good space at the gum to make them self-cleansing.

(*c*) For first quality of teeth would use non-cohesive gold in place of tin, and then proceed as above.

(*d*) Would use a steel matrix held in place by Perry separator and wooden wedges. For teeth standing alone would use a steel loop matrix.

Dr. WILLIAM H. CARPENTER, Providence. Presuming that the teeth in question are suitable for restoration by filling, I should use for that restoration gold contour work with the aid of matrix, and that in every instance. I fully believe that a good operator can get the best results (those most resembling nature and hence nearest to perfection) with soft gold cylinders at the cervical wall and two-thirds the way up toward the grinding-surface, continuing toward the top with semi-cohesive and finishing with cohesive gold, or, where the surface receives too much attrition, with gold and platinum (rolled), No. 60. In cases of very poor tooth-structure I sometimes use at the cervical wall a few pieces of gold and tin, No. 3, folded together and lightly rolled into cylinders.

In all cases the matrix must be used. It simplifies matters greatly, and produces, I think, the only perfect filling. The matrix may be of any kind the operator prefers, provided it is of steel. I use cold rolled steel very thin, and shape and fit one to suit each case, holding it with either gutta-percha, cement, separator, or whatever I think best suited to gain the end desired,—viz, a nice gold contour needing but little finishing on the approximal surface, most of which can be effected with the burnisher.

The shaping of cavities much depends upon the amount of material at hand, as we all well know. I do not believe in sacrificing tooth-structure o prevent margins from touching, for this can be prevented by obtaining a little extra space and then bulging the filling sufficiently to hold the margins away from each other. I believe that no flat surfaces should exist, but in all cases the surfaces should represent segments of two circles. The cavity should contain no grooves or pits if it is possible to prevent them, and it is in most cases. The matrix should be kept in place until the last piece of gold has been introduced.

### *Discussion.*

Dr. C. F. BLIVEN, Worcester, said, "The subject before us is an all-important one. The successful treatment of approximal surfaces depends upon the patience, endurance, experience, skillful manipulative ability, and judgment of the operator. Cause and effect must be considered along many lines to reach a successful issue; the health of the patient first of all, and here the opportunity of the dentist is a tremendously great one. If he wishes permanent results he must first learn if sensitive surfaces in the dental arch cause ill health, or if ill health is the cause of tooth destruction; for I claim that in a normal condition of the osseous system, teeth will not decay.

"In treating these surfaces we must also consider the type of teeth we are to operate upon, the relation of each part to every other part and to the whole, decay, gum, dentin, enamel, etc. Having a clear comprehension of the situation, we are ready to treat the lesion; let us first consider permanency, not necessarily of the filling, but of the tooth. What will save it.

"How the cavity should be prepared depends upon the filling-material decided upon. Gold, soft or cohesive, amalgam, gutta-percha, or cement. Soft gold requires four strong walls, and cement, gutta-percha, and amalgam a square cavity. Natural contour must be restored, and with cohesive gold it may be done in such a manner that the tooth will not only hold the filling, but the filling hold the tooth.

"Dentists often complain of the difficulty of inserting pin-head fillings, and expect as great durability for large ones without considering the malleability of gold. However, good or bad, it is a daily surprise to me not that fillings do not last longer, but that they last as long as they do, especially when we consider the difficulty surrounding the insertion of fillings, and that at best they are only an artificial substitute for lost tissue. We are to-day seeking the perfection of parts, that the whole may be perfected. Assuming this to be accomplished, supposing perfect filling-material had been found and the art had been perfected in all its details, has the ideal dentist been evolved? I think not. When by precept and example we singly and collectively have attained to that ideal condition when we can teach patients to save their own teeth, we will no longer find it necessary to look to externals to elevate the profession. To-day we relieve; then we shall regenerate. Regeneration is salvation.

Continuing, the speaker said every dentist should make himself familiar with every method of saving teeth. It is a tremendously important subject that these answers treat of, as the bicuspids and molars decay more frequently than any other teeth. He thought crowns were, or should be, the last resort. A filling will usually save a tooth longer than a crown will; only when a tooth could not be filled should it be crowned. He cited the following cases to show the effect the bad condition of the mouth had upon the general health, and the effect of ill health upon the teeth. The first case was a young lady who had been under the care of a physician for about three years for nervous prostration. She was so timid and nervous that it took two sittings before he could get her into a condition to begin to operate. The molars and bicuspids exhibited soft white decay. He excavated as little as possible, saving the margins, and filled with cement. In a year she had recovered from her nervous prostration and gained twenty or twenty-five pounds.

The next case was a lady who had lost so many teeth that she had not a masticating surface in her mouth; she had about four front teeth with which she could eat. Her health had been so poor that she had been constantly in the hands of her physician for about four or five years. The doctor urged her to have bridge-work inserted, and after some time she consented. He constructed a bridge of five teeth, which gave her twelve good masticating teeth. In a very short time the effect of the better mastication of her food was apparent, but the patient was annoyed by the fact that unless she was careful when she leaned forward the water would run from both sides of her mouth. She consulted the doctor about this, and he told her she was all right, but the salivary ducts were so much more active under the more favorable conditions that she would need to get acquainted with them again. In a short time they were under control and the trouble ceased. The third case was a beautiful young lady whose mouth he had put in good condition. She had excellent teeth, and he was much surprised about two years afterward when she came to him with a peculiar waxy appearance on both sides of the buccal teeth, and on examination he found numerous cavities of decay. He learned on making inquiry that the lady was just recovering from an attack of fever, and that she was taking a preparation of iron. He told her that it must be stopped at once or the teeth would be ruined. Her physician, however, told her that the preparation did not contain any acid. Her food, too, was very unsuitable; the family were all employed at different occupations, and did not take time to prepare the meals. All that was possible was done for her teeth and a wholesome diet was prescribed, and she was dismissed. A few years afterward she returned to his office in an exceedingly bloated condition, and told Dr. Bliven that the fillings he had put in had come out, and she had to have the teeth extracted and was wearing a set of artificial teeth. He believes that the food upon which she lived had destroyed her teeth, and finally destroyed her, for a short time afterward he learned that she was dead.

He cited these cases to show the necessity of taking the general health into consideration. The permanency of the tooth is important as well as the permanency of the filling.

Dentists sometimes get the financial fever, and in their hurry to get money do not take time to do saving operations upon the teeth, forgetting that these chickens come home to roost.

In his practice he used cohesive gold in every case where it was possible; when decay is very deep and conditions are favorable, he would apply a matrix of tagger's tin or German silver and fill the cavity with gutta-percha, then taking a burnisher he wipes the gutta-percha away from the margin and puts in a pin for retaining, and then at the cervical margin he begins putting in soft gold or semi-cohesive gold. He often fills a cavity with amalgam and fills out the contour with cohesive gold.

Dr. J. G. W. Werner thought that it would require a very skillful man to fill teeth as Dr. Bliven described with gutta-percha and soft gold. He thought the method was all wrong, and for an average operator to attempt it would bring contour work into disrepute. Contour work should be so built as to exist for all time, and should not be built upon mud foundations. He thought it much better to use soft gold for the bulk of the work, and to finish with cohesive gold. In extremely fragile teeth he would partially fill with tin and gold. This is much better than to fill with amalgam, because the tooth will be kept white, while amalgam discolors it.

Dr. Geo. C. Ainsworth thought the better way to fill large cavities was with a matrix and soft gold, and by soft gold he meant gold that could not be made cohesive. In his opinion a man who fills entirely with cohesive gold in large cavities does what will exhaust his strength, but will not save the teeth as well as would a combination of cohesive and soft gold. We have all seen the old soft gold fillings which preserved the teeth but looked badly, and have taken them out for that reason. He now used a soft-working gold that was the least bit cohesive. At the cervical wall he often used tin and gold, then with soft-working cylinders he would fill the cavity half full or more and begin with cohesive ribbon while he had room to make retaining cavities. In this way he thought he got the best result possible.

Dr. GEORGE L. PARMELE presented a symposium of views on the question of the advisability of "Extracting Teeth during Acute Pericementitis." He had sent a circular letter to a number of prominent dentists, asking the following questions:

Assume that a given tooth is valueless and condemned to extraction; that it is in a condition of acute periodontitis, an abscess is forming or has formed.

Is it proper at such time to extract this tooth?

If yes, why? Are there attending dangers?

If no, reasons, and course you would pursue.

This query is the result of a talk with physicians, who tell me they often have difficulty in getting dentists to remove teeth at such times.

Dr. Parmele said that about a year ago he had been asked by a physician why dentists would not extract a tooth when it was inflamed. At first he supposed that a tooth was meant that was in a condition that might be treated and the tooth saved, but found that he meant a tooth that would have to be extracted certainly, and the physician had found that dentists objected to extracting such a tooth at once, but insisted on waiting till the inflammation had gone down.

As a result of that conversation fifty letters were sent out, and answers received from thirty-four, as to whether it is proper to extract a tooth under the conditions set forth in the query. Affirmative answers were received from all but one of the thirty-four practitioners who responded. The substance of a number of the replies is here given:

Dr. C. E. FRANCIS advised immediate extraction, "to check the trouble as soon as possible and prevent more serious results, such as increased and more aggravated inflammation, suppuration, and the consequent breaking down or destruction of surrounding tissues." He did not believe there were attending dangers where the operation of removing the teeth is successfully performed and proper precautions are taken to allay any existing inflammation, and the alveolar cavity is rendered free from septic matter.

Dr. J. D. PATTERSON advised extraction of such a tooth, "for the reason that the risks are greater in leaving it in than in extracting; risks of prolonged suffering and the sequelæ of abscess." He believed there were hardly any attending dangers. His experience taught him that in the extraction of such teeth the inflammatory products, pus, bacteria, etc., are sometimes forced into new territory by the operation and additional swelling is occasioned, but this is temporary and usually disappears.

Dr. Benjamin Lord stated "that it was his practice to extract, believing that the parts are more likely to be relieved than irritated by the operation; that it is the lesser of two evils."

Dr. G. V. Black advises extraction, and admits the danger of sepsis, but believes this danger is reduced rather than augmented by immediate extraction. He says, "I am not unmindful of the fact that very grave conditions have developed after extraction in such cases. I have also seen grave conditions follow ordinary extraction, the result of infection. Still the patient is placed in a better condition to ward off danger by the immediate removal of such a tooth, and the possible danger of a graver infection than the one existing at the time should not cause us to hesitate. Of course, proper precautions should be observed, and the after-treatment should be adapted to the conditions."

Dr. Wm. J. Rider says, "I can scarcely understand how any intelligent dentist can refuse to extract a tooth in the condition you speak of. A dead tooth is a foreign member, and inflammation and suppuration is nature's process to throw off anything dead, as tooth, bone, splinter, etc., from the system. By leaving the tooth in, if in the upper jaw, back of the cuspid, there is danger of inflammation of the antrum; if in the lower jaw, of forming a fistula discharging on the outside. By all means take it out as soon as possible, provided the patient is not too weak, or cannot take some anesthetic to relieve the pain."

Dr. Thomas C. Stellwagen says, "It is not under ordinary circumstances proper to extract teeth that are in a condition of acute periodontitis. The attending dangers are the increase of the inflammation of the surrounding tissues and 'phantom toothache.' The course to pursue is to treat and relieve the difficulty. Remove cause as far as possible, and with antiphlogistic, antiseptic, and soothing applications endeavor to arrest the spreading of the inflammation and relieve the pain; warm water held in the mouth and replenished every few minutes for half an hour to even one hour; applications to the interior of the pulp-chamber of the affected tooth, such as about equal parts of carbolic acid and camphor; externally paint the skin with aqueous solution of cadmium iodid, or tincture of iodin; warm foot-baths, etc., to divert the blood-flow. The danger of an abscess pointing externally, when the lower teeth are affected, makes it desirable to avoid delay in reducing the inflammation in such cases."

Dr. W. H. Morgan advocates the extraction of such a tooth, because, by the conditions laid down, no effort is to be made to ultimately save it. He regards the attending dangers as possible, but very remote; and in general he would extract.

Dr. H. B. Noble recommends the extraction of such teeth; has often done it, and never saw or knew of any serious results. In a few cases, where there was considerable swelling, an abscess formed and had to be opened, but he believes that extraction mitigated the pain

Dr. S. E. Davenport says, "If a tooth be in such condition as to make its condemnation to forceps excusable, it must necessarily be an acute irritant, and its retention dangerous not only to the surrounding parts, but to the general health. That being the case, the quicker it is removed the better, all common-sense reasoning favoring its immediate banishment, as though it were a splinter in the flesh. The fact that inflammation and suppuration occasionally continue after such extraction proves nothing against the advisability of removing such a tooth, but, on the contrary, shows how urgent was the need for such action, and suggests the probability of necrosis or bone caries."

Dr. J. Hall Moore says, "I cannot imagine a case where it would not be proper to extract such a tooth, because such a tooth has become a foreign body and will be a source of irritation as long as it remains. We proceed on the same principle as with a splinter, bullet, or any other foreign body; remove it and nature does the rest; let it remain and it continues to be a source of trouble and danger. I think there is absolutely no danger accompanying the speedy removal. In forty-four years' practice, I have never seen any untoward results from extraction in such a case."

Dr. C. C. Barker says, "The cases are rare and would be decidedly exceptional in character where I would not advise immediate extraction. If the tooth, with its septic pulp, is the cause of the trouble, its extraction will be the removal of the cause; the bleeding incident thereto will measurably relieve the inflammatory congestion, and at the same time will open the very seat of the difficulty more effectually and surely than the lancet, and give free track for pus-flow, if there be any. The same danger exists here, doubtless, as in the case of other wounds, and antiseptic care and treatment is certainly demanded."

Dr. R. R. Andrews would extract in ordinary cases, because, as the exciting cause of the trouble, the tooth should be removed. In the majority of cases extraction is followed by relief and cure. "There are attending dangers, but with proper treatment, having due regard for the value of modern antiseptic methods, these dangers are seldom met with."

Dr. C. D. Cook would extract at once. He says, "I have never known harm to come from such practice; it is the quickest and surest way to relieve pain. I know of no danger in extracting that is not incurred by keeping the tooth in the mouth. I should say there was no danger. I only remember one case that did not immediately recover; in that case an abscess formed, notwithstanding the extraction of the tooth."

Dr. H. T. Smith says, "The two conditions of condemned tooth and acute pain would justify immediate extraction in almost all cases. The remote possibility of septicemia is eliminated by proper antiseptic precautions during and after the operation."

Dr. Levi Parker says, "It has always been my practice to extract any teeth in any stage of ulceration, when worthless, as the only course to be pursued. I have never known any danger or unpleasant results to follow, but, on the contrary, the utmost satisfaction and relief to patients. There may be pain following the removal of the tooth, but those that are painful afterward are easily taken care of by removing the coagulated blood and syringing with an antiseptic wash, with water as warm as the patient can bear it. It is sometimes necessary to syringe the cavity a number of times, for a week or ten days in some cases."

Dr. J. FOSTER FLAGG says, "In a practice of nearly fifty years, I do not recollect a case in which I have not considered extraction as the proper thing to do. Why? Because it is the cause of the trouble, and on general principles the removal of a cause, if practicable, is the first indication. Subsequent treatment may be required,—dependent, of course, upon temperamental attributes."

Dr. FANEUIL D. WEISSE says, "Extraction is proper to give exit to pus. There are no attending dangers except in diabetes."

Dr. H. S. LOWRY says, "I have never yet hesitated to extract a tooth when in a condition of acute periodontitis, or in any of the three stages of inflammation. When the tooth is valueless and condemned, there is no pathological condition to which it is subjected which would be augmented by extraction. Conditions that would produce, for instance, necrosis, would produce it more quickly and more extensively by allowing the tooth to remain than by extracting it. The removal of the cause of any pathological condition could not possibly increase the disease. If, after the extraction of the tooth, more pain and inflammation seem to ensue than were present prior to extraction, it would probably be due to a stopping of the socket by blood-coagulation preventing or suppressing 'weeping' of the wounded peridental membrane, thereby causing pain and additional inflammation. Hence the conclusion is that if trouble ensues it is due not to extraction, but to want of mechanical and therapeutic treatment after extraction."

Dr. W. F. LITCH says, in response to the query, that, in his judgment, "the general rule of practice is fully applicable to the hypothetical case presented. That rule is, in very acute inflammation of tense and resisting issues which cannot be arrested by local or systemic medication, the lancet or its equivalent should be used early and freely, in order to permit the discharge of blood and serum and thus relieve tension and lessen the danger of the further extension of the inflammation in the diseased parts or to contiguous tissues. In the case of peridental inflammation of a valueless tooth, extraction would usually be the equivalent of lancing. If extraction fails to give relief, it may be assumed that the inflammation has extended to the cancellated structure of the maxilla, and the opening up of that tissue by the lancet is generally indicated. Failure to do this is often the reason why in acute cases pain sometimes continues for hours, or even days, after extraction, usually with the result that pus forms and burrows its way out at the point of least resistance, which is generally the socket of the tooth, but is sometimes quite remote from the region usually involved."

Dr. C. N. PEIRCE says, "A worthless tooth in a condition of acute periodontitis, an abscess forming, but pus not yet through the alveolar walls, will, if extracted while in this condition, invariably give serious subsequent trouble, such as severe, excruciating pain for two or three days, or even a longer time, resulting in necrosis of the process and sometimes of the jaw, terminating with an abscess in the cheek and fistula of the external surface. In a large majority of cases I believe this result can be aborted, the inflammation can be eliminated, and the necrosis prevented. I do extract teeth and roots in the above-described condition, but I first warn the patient that on the removal of the tooth the pain will be excruciating. To relieve this I use a ten per cent. solution of cocain and a strong solution of hydronaphthol, one drachm to two ounces. I first saturate the cavity with the cocain solution, then apply the hydronaphthol solution for some minutes on cotton, keep the patient in the office until the pain subsides, and if not relieved in a limited time saturate the socket with sulfuric acid of commerce, fifty per cent. solution. If the patient complains of subsequent discomfort, I should use the sulfuric acid until uneasiness subsides."

Dr. M. H. CRYER says, "Extract immediately; it is an axiom of surgery in the treatment of inflammatory conditions to first remove the cause of irritation. As the cause in this case is infection of the pericementum, and later of surrounding parts from the pulp-canal of the tooth, the removal of the tooth is the first step in the removal of the irritation. To further insure the destruction of the active cause of the inflammation, the socket should be thoroughly cleansed and freely washed with antiseptics. The neglect to extract entails great suffering, prolonged for some days, and involves the destruction of more or less tissue. Moreover, pus formed in and about the jaws is always a source of danger until freely evacuated; following the line of least resistance, it may pass directly into the nasal chamber or through the maxillary sinus, or through and into the ethmoidal cells and nasal chambers, or through the infundibulum into the frontal sinus. When in the lower jaw the pus may pass into the cancellated tissue or into the tube of the inferior dental nerve and vessels; from there it may burrow through the bone at its weakest point and pass out onto the face or into the hyoid region, or back into the pharynx. Loss of health and life have often been the result of neglect to remove such teeth. So long as pus remains without vent, the danger of septicemia or pyemia is always to be kept in view."

Dr. JOHN F. DOWSLEY says, "Extract immediately; see that your instruments are clean. Take care of the case afterward by freely using hydrogen peroxid."

Dr. GEORGE A. MAXFIELD, in answer to the first query, says, "Extract; and the quicker the better, because it is an offending member, and in the majority of cases all trouble ceases after the removal of the tooth. If inflammation continues after the tooth has been extracted, it can be easily treated through the tooth-socket. Delay is dangerous, for in all these cases there is always danger of septicemia. The swelling does not subside until after the formation of pus and its discharge. With teeth in the lower jaw the fistula is liable to occur on the face, thus disfiguring the patient for life. There is no valid reason why the tooth should not be extracted. There are no attending dangers, taking for granted that the dentist uses proper antiseptic precautions, and that the patient is not bordering on collapse."

JACOB L. WILLIAMS, M.D., says, "If the valueless tooth with acute periodontitis is liable to break or crumble in extraction, the amount of wounding and bruising of the inflamed tissues incident to removal of the roots would in some constitutions cause an increased and prolonged state of the local inflammation. If an abscess has actually formed relief may more generally be obtained by lancing, deferring the extraction until there is less turgescence of the tissues."

Dr. J. F. WRIGHT says, "Assuming that the tooth is valueless and condemned to extraction, I always advise that no time be lost in its removal, no matter what the condition of the adjacent tissue. I have met with opposition often, but could never understand their point of view. If we could remove the cause of every disease as easily as we can the cause of a dental abscess, there would be very little suffering."

Dr. THOMAS FILLEBROWN says, "Extraction is proper and ought to be done, because it will abort the abscess in nearly every case and save the patient hours, and maybe days, of suffering. I have no knowledge of attending dangers, and do not apprehend any. The danger lies in retaining the root and inviting pyemia and necrosis."

Dr. W. C. BARRETT says, "It is impossible, within the compass practicable to me at this time, to give a fitting answer to the queries. Of course, there may be such complications as would make it unwise to extract a tooth, but the circumstances, in my opinion, would be uncommon indeed. If there was such an acute osteitis present as threatened the entire suspension of nutrient currents in calcified territory, it is conceivable that to make a wound in the bone might further increase the danger. But that would imply conditions which, while possible, would be extremely unusual. If there existed extreme pericementitis, of course there must be osteitis, but under ordinary circumstances the relief of the former should alleviate the latter.

"If then the tooth was, as you say, condemned to extraction, I should remove it, but pericementitis, or incipient abscess, is not sufficient cause for so dooming it, even though it may be of a very acute nature."

Dr. S. H. GUILFORD says, "Under the conditions laid down, I should extract at once, regardless of the pericemental trouble. I would administer an anesthetic to avoid pain. No harm can follow its immediate extraction, and much suffering may be saved thereby."

Dr. J. D. THOMAS says, "I recognize no condition of inflammation or period in its progress when it may be injudicious to extract. The tooth being the cause of the trouble, the sooner it is removed the better for all concerned. If left for the inflammation to subside, no one can tell to what extent the surrounding tissues may become involved. Invariably the process, tooth-plate, and septum will become necrosed, thereby weakening adjoining teeth. I have seen several cases where the loss of several teeth as well as of the contiguous process has followed, and which I am positive could have been avoided had the original tooth been extracted. To my mind, the idea that a tooth should not be extracted while in a state of acute pericementitis, or incipient abscess, is as great a defect in dental teaching as is the recommendation to apply a poultice to a swollen face, so frequently resorted to by the medical fraternity. Such a case can be treated far better with the tooth removed. Many dentists seem to think the extraction of the tooth the end of the difficulty, no matter what may have been its previous condition; and if they deem any treatment necessary it is usually with antiseptic and astringent applications, when quite the reverse is indicated. No physician would open an abscess or felon and dismiss his patient, nor would he make application to immediately induce the healing process, but would continue the promotion of inflammation until it had run its course. So it should be in tooth-extraction; in my experience the best way to accomplish this is by the use of hot water in the mouth. If the inflammation proceeds to pus it will hasten it greatly, and should it not do so the heat will promote diffusion, and relief will quickly follow. After which clean the socket of putrescent matter, and with the use of antiseptic applications the cure is readily effected."

Dr. W. H. RIDER says, "Should almost invariably extract. Cases are rare in which any trouble follows, such as further swelling, suppuration from necrosed bone, or from the sac, if any, being left behind. Hemorrhage occurs at times, but is usually easily treated."

Dr. GORDON WHITE says, after eighteen years' experience, he "should not for a moment hesitate to extract the tooth in question. It would relieve the pathological condition and save the patient hours and sometimes days of suffering, which, in such a case, he deems highly unnecessary."

Dr. C. T. STOCKWELL says, "Provided the tooth is extracted and the socket is treated in an up-to-date scientific manner, I should in a general way answer yes. I assume that the question relates to cases where the conditions named are traceable to the tooth as direct antecedent, if not actual cause. If the condition is that of acute pericementitis, I should expect the hemorrhage following the extraction to afford relief; it would also be in the line of removing the cause of the trouble. This would also apply to that condition you designate as 'forming' abscess, although acute pericementitis might be considered a part of the process of a forming abscess. If the abscess had formed, extraction, it seems to me, is especially indicated, for the reason that pus-evacuation is of prime importance, and may as properly and as well be secured by extracting the tooth as by opening up the abscess in any other way. We thus gain direct access to the seat or focus of the difficulty. I cannot see that anything is gained by allowing the cause of the trouble to remain, nor do I see why any danger from septicemia or pyemia is increased, provided that proper antiseptic precautions are observed. Theoretically, in my opinion, there would be less danger of septicemia by extracting the tooth than by any other method of treatment with the tooth remaining *in situ.* While there may be theoretically somewhat more danger of pyemic complications if the tooth is extracted, this danger I consider of too slight a character to outweigh the advantages to be gotten by getting rid of the tooth. Whatever method of pus-evacuation is adopted, the operation should be performed under the most stringent antiseptic conditions. Such adverse results as from a clinical point of view are supposed to follow the extraction of teeth under the conditions named are in my opinion not chargeable to extraction *per se,* but to the lack of proper antiseptic precautions.

"This leads up to the last question, 'Are there attending dangers?' No one can deny that there are attending dangers, but, as indicated above, they are avoidable by scientific means well known to the medical world to-day. In the practice of those who use forceps or lancets never sterilized, to say nothing of failure to apply germicidal treatment immediately after the tooth or teeth are extracted, all operations are placed in the class where of necessity 'the attending dangers' are of a high rate."

Dr. B. HOLLY SMITH says, "If such a tooth is to be extracted, the sooner the better, provided it be done under proper precautions; nothing is to be gained and everything lost by waiting. I have myself encountered both from our own and the medical profession opposition to extraction at such a time. I am, however, under the impression that this opposition has arisen from observation of cases of blood-poisoning which resulted from infection from the dental instruments employed, or from germs taken into the mouth after extraction. It is my practice to employ special antiseptic precautions in these conditions; instruments should be thoroughly sterilized, and antiseptic dressings used in the alveolar socket from which the tooth has been removed."

Dr. J. A. LIBBEY says, "Would favor extraction in such cases, provided the physician has been consulted by the dentist, and no danger of shock is to be anticipated." He had seen cases of necrosis that appeared to be the result of tooth-extraction during the inflammatory condition. He desired to emphasize the point that in all such cases the physician and dentist should meet and consult.

(To be continued.)

## ANNUAL CONVENTION OF THE SIXTH, SEVENTH, AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

THE twenty-ninth annual union convention of the above-named societies was held in the Colonial Parlors of "The Genesee," Buffalo, N. Y., October 26 and 27, 1897; Dr. S. Eschelman, president of the Eighth District Society, presiding.

### First Day—*Morning Session.*

In the president's address, after welcoming the visiting societies to Buffalo, and speaking of the advance dentistry has made in recent years, Dr. Eschelman said, "While our progress has been rapid and much has been accomplished, there still remains a great deal to be done in order to preserve the natural dental organs.

"In diseases of the gingival margin there still remains a field for future investigations in order to settle its pathology and find means, both surgical and medicinal, whereby the great loss of teeth through pyorrhea alveolaris can be arrested.

"In prophylaxis there is another avenue open for good work. While we have been able to definitely settle the pathology of decay, we have not as yet made great progress in the prevention of caries. While we know that bacteria are the exciting cause of caries, there is still much to be learned of those conditions which make their development possible. While some conditions, such as moisture, heat, air, etc., favorable to their development, always exist in the mouth, we also know that when the health of a subject is perfect, and though the conditions favorable for bacterial development are present, they are not capable of producing decay. Those forces of the body which establish immunity require to be better understood, as well as the remedies which will restore that condition when not present in normal degree."

In regard to education and laws controlling practice in the state, he said, "Our state and district societies should be on the watch and see that the laws are enforced and the standard maintained. I am informed that the colleges in our state are claiming that our standard is too high; that it is decreasing the number of students, and that an attempt to lower the entrance examinations is going to be made in order to increase the number of students in our colleges. As the schools are guided by purely mercenary motives in objecting to the Regents examination, any attempt at lowering the standard of our excellent dental laws, to obtain which it has taken years of earnest work on the part of those who have the interest of the profession at heart, should be strenuously and emphatically opposed by the profession through their different societies in the state.

"If we desire to be honored and respected as a learned profession, our ranks must be composed of men of education, culture, and refinement."

On the conclusion of the president's address various committees submitted reports which received appropriate action, and after this routine business was disposed of, Dr. L. S. Goble, Rochester, read a paper entitled "Painless Dentistry," which is printed in full at page 14 of the current number.

### *Discussion.*

Dr. M. B. Straight, Buffalo, commended the paper for the directness with which it treated the subject. Painless dentistry is one of the most important subjects one could consider. The essayist's ideas, as a rule, were in line with his own, and he thought the reliance upon sharp instruments and the patient study of each subject would enable us to do much more for the comfort of our patients than would a reliance upon drugs.

Dr. W. A. Barrows, Buffalo, asked Dr. Goble whether he used aboline oil alone or in combination with other preparations.

Dr. Goble said he used it in combination with oil of cloves to get the tooth in a good condition.

Dr. C. W. Stainton said there was one thing in the paper that was opposed to all of his experience,—that was to have the patient in a state of relaxation when about to perform an operation likely to be painful. In his experience he had found it advisable to notify the patient that pain was coming, and advise him to grasp the arms of the chair and let him set his muscles so as to endure the pain better. He knew that the hypnotists practiced the relaxation method, but he had never found it as successful as the contrary. Another procedure of Dr. Goble's which he did not believe advisable was to desiccate the tooth-surface before cutting it. He always avoided anything that would heat the dentin when i was to be cut, and some persons are so careful about this that they arrange a pipe so as to carry a small stream of water into the tooth while using the bur. He did not use this, but did nearly all his excavating before applying the rubber-dam.

Dr. W. W. Belcher, Rochester, thought the use of a chisel in excavating very good, but many patients object to it; to them it seems as if a gravel train had struck them, it is so excruciating to their nerves. He gets along more painlessly and quite as rapidly with good sharp burs.

Dr. H. H. Tompkins, Utica, commended the paper for its versatility, in that it described different methods as adapted to different conditions. One method will not meet all conditions in the different subjects. There is much in mental impression; when the patient has full belief in the operator, pain will be endured much better than where such faith is lacking. He spoke of coryl, which, he said, is imported by C. Ash & Sons, and is used in an apparatus called coryleur. He recommended this very highly. With another remedy, Calvert's crystals of carbolic acid, glycerol, and cocain, he had had gratifying success in a cervical cavity which was so painful that the touch of an excavator was unendurable. This preparation was inserted for about ten minutes with great benefit. The man who is to succeed in painless dentistry must not depend on one manner of practice, but must intelligently apply the best course of treatment to the different conditions presented by his patients.

Dr. W. C. Smith, Buffalo, agreed as to the necessity for a study of the temperaments of patients and the condition of their health as means to determine the course of treatment best to pursue. He had got good results by prescribing the use of the milk of magnesia. In other cases he had prescribed bicarbonate of soda, followed by applications of alcohol, creosote, and oil of cloves. He found a value in the use of hypnotic suggestion. He had hypnotized a person while attempting to apply cataphoresis. He instructed the patient to tell him as soon as he felt the current, but before he turned it on far enough to get any effect the patient said that he felt it all over, and that it made him sleepy; so the operation was performed painlessly under the hypnotic suggestion, without further use of the cataphoric apparatus.

Dr. F. I. SUMNER, Norwich, thought it much better not to tell the patient when he was going to hurt. The better way is to do the work as rapidly and carefully as possible, and then, if the patient complains, say that you will do something to allay the pain, and alter the method of procedure.

Dr. STAINTON thought it much better to tell when he was going to hurt the patient; it gave the patient confidence that the operator knew what he was about.

Dr. W. CUTTINGS WILBUR, Corning, said that at certain times during each month lady patients were more nervous and susceptible to pain than at other times, and it was advisable to postpone work on the teeth till the nervous strain was removed and the balance of the system restored to normal.

Dr. GOBLE said that Dr. Belcher's remark about the patients objecting to the chisel is true, but that this is where you must get the patients' confidence. Tell them that you are about to do that which will make a noise that will be unpleasant, but that noises do not hurt. Be exactly truthful, and the confidence they will have in you will help you over many difficulties. After the first jar of the chisel they will usually become quiet.

The hypnotic suggestion may be tried in two or three different ways. Should a patient seem as if about to faint, stop the operation and say to her, "In a moment you will feel a flow of blood to the head; now you will feel the current surging through your neck. There, now you are better. Take a sip of water. Now you will feel the blood flowing away, going toward your feet. Now you are all right." Such suggestions will nearly always work.

In his practice the milk of magnesia had sometimes entirely failed to allay the sensitiveness of the teeth. He had one patient who used it six times a day for a month, and at the end of this time the tooth was exceedingly hypersensitive. He spoke of a mouthwash furnished to him by a German druggist of Rochester, which he had found efficacious, and promised to have the formula at the next meeting of this association.

On motion, the subject was passed, and the convention adjourned to meet at 8 P.M.

### *Evening Session.*

The convention was called to order at 8 P.M.

Dr. C. W. STAINTON read a paper entitled, "An Interesting Biography," being an account of the life-work of Charles Goodyear, and of his heroic struggle against poverty and discouragement in discovering and perfecting the art of vulcanizing rubber. The paper was listened to with interest throughout, but is not so directly connected with dentistry as to justify us in devoting to it the necessary space.

Dr. F. M. ROOD, Rochester, described a method of placing porcelain faces on gold crowns for the purpose of masking the gold crown and presenting the porcelain face to view, thus avoiding the glaring appearance of the gold in the front of the mouth. He selects porcelain teeth having pins very near the cutting-edges, so that the pins would lie on the top of the crown. He prepares the tooth as for an all-gold crown, first removing the cusps and as much of the buccal surface as possible. To the tooth thus shaped he fits a crown, and then grinds the porcelain to fit the buccal surface of the crown. The pins are not cut off, but extend over the top of the crown to help form the cusps of the tooth. When the porcelain is ground to fit, No. 28 gauge gold is used to make a tip over the edge of the porcelain, and the crown is invested and soldered together and the cusps formed as usual.

A case sometimes presents of a central or lateral which is undersized and probably stands back of its proper position in the arch. Such a tooth can be crowned with a porcelain face in such a manner that the porcelain will be in line with the other teeth and cause a very pleasing change in the appearance of the mouth. English teeth should be used in these operations, as they can be ground and polished much better than American teeth can. No. 28 gauge gold should be used for these crowns. It would be a little more difficult to work than thinner gold, but would give much better service.

(To be continued.)

## SOUTHERN DENTAL ASSOCIATION.

(Continued from page 1036, vol. XXXIX.)

### SECOND DAY—*Morning Session.*

CALLED to order according to adjournment; the president in the chair.

Dr. FRANK HOLLAND, Atlanta, Ga., chairman of Committee on Operative Dentistry, reported three papers: "An Obscure Case," by Wm. Ernest Walker, D.D.S., Pass Christian, Miss.; "Replantation in Pyorrhea Alveolaris," by Robert Eugene Payne, M.D., D.D.S., New York; "The Compatibility of Different Filling-Materials with Tooth-Structure," by Dr. I. N. Carr, Durham, N. C.

On motion, Dr. WALKER read his paper, an abstract of which was printed in the DENTAL COSMOS for September, 1897, page 758.

### *Discussion.*

Dr. JOHN S. MARSHALL. It is extremely difficult to make a diagnosis in cases of this character from mere description without seeing the patient. From the description given I should be inclined to say that it is not tubercular. There would be no difficulty in finding the tubercle bacillus if present. I do not think it can have been malignant, to begin with, as it has been in existence too many years. It strikes me as being a cyst which may have originated from a molar tooth,—the palatal root; it might very possibly be due to an undeveloped third molar. From the character of the discharge as described I should judge it was due to cystic degeneration. If it is the result of an unerupted tooth, there would be no difficulty in determining that fact. We do not know, of course, how careful an examination has been made. (To Dr. Walker.) Is the molar tooth vital?

Dr. WALKER. It responds to every test for vitality and is not decayed.

Dr. MARSHALL. That eliminates the possibility of its being the result of an abscess from a pulpless tooth. I do not feel like saying anything further, not having seen the patient.

Dr. J. P. CORLEY. Are there no symptoms of antral trouble?

Dr. WALKER. None, and I have probed carefully. The probe does not enter the antral cavity, and it encounters nothing but soft tissues.

Dr. EGGLESTON. Has there been any pain?

Dr. WALKER. The patient stated that during the first four years she experienced no inconvenience whatever, except from the occasional swelling. There was no pain at all. In 1894 the swelling was so great as to occasion great difficulty in swallowing, and some pain due to inflammation.

Dr. SMITH. I hardly think it can be malignant, as there has been no pain and progress so very slow. It may, however, have taken on a malignant character. I would suggest that an X-ray photograph be taken and see what would be revealed.

Dr. T. W. BROPHY, Chicago. It would be difficult to express an opinion any more definite than that of Dr. Marshall. The diagnosis is not sufficiently positive for discrimination without seeing the patient, but as far as it goes I agree with the opinion expressed by Dr. Marshall,—that it results from the formation of a cyst. The gelatinous discharge described is that peculiar to cysts of this region. I would recommend more thorough exploration and a more extensive operation; that the cystic cavity be opened and the lining membrane thoroughly removed, the cavity then well packed with gauze, with a liberal opening for drainage. Granulations would eventually fill up the cavity and the patient be cured. Tumors of the type described are very common, and the only rational treatment is to open liberally in order to make an ocular examination. It can then be removed with certainty. It may be that a retained deciduous or a supernumerary tooth forms the nucleus of the cyst. I would recommend a liberal opening and curetting of the cavity.

Dr. GORDON WHITE, Nashville. The case described by Dr. Walker resembles very closely a case I had a number of years ago, which I found, on opening, to be due to a supernumerary tooth. It had given trouble for years. Another similar case was due to an unerupted bicuspid. I did not have any microscopic examination made of the tissues, but I fancy that if Dr. Walker will go further with his exploration he will find that it is due to an unerupted tooth.

Dr. W. T. Arrington, Memphis, Tenn. I had a case almost parallel to the one described in the paper. The exudation was of the same character. Local treatment did no good. There was no decay, no fillings, no tartar. Being unable to locate any cause for the trouble, I decided to open into the tooth nearest the seat of the trouble, and found that it was dead. The mere fact that there is no decay is not always proof that there is not a dead tooth. I believe that if Dr. Walker would remove that tooth the patient would get well.

Dr. W. W. H. Thackston, Farmville, Va., presented the greetings of Dr. Joseph R. Woodley, one of the early members of the Southern Dental Association, who was unable, because of illness, to attend the meeting, and in his behalf presented to the association a framed picture, a group of many of the early members of the association. The gift was accepted with a formal vote of thanks and the secretary instructed to convey an expression of appreciation of the gift to Dr. Woodley, with sympathy in his illness.

Dr. Peirce, on behalf of the American Dental Association, tendered an invitation to the members of the Southern Dental Association to witness the lantern exhibit of "Developing Tooth-Tissue," by Dr. I. N. Broomell, on Wednesday evening.

On motion, adjourned to meet at 3 P.M.

### *Afternoon Session.*

The special order of business for this session being the consideration of the report of the committee on union of the two associations, the chairman, Dr. L. G. Noel, read a report favorable to the object, and suggesting that an early time be fixed for holding a general conference of the members of the two associations with a view to perfecting a plan of union.

The committee on the president's address reported verbally through its chairman, Dr. Noel, that, inasmuch as the president's address dealt chiefly with the question of union of the associations, they had not felt it necessary to present a written report, but expressed their hearty commendation of and co-operation with the suggestions as embodied in the address.

The report of the committee on union being open for discussion, Dr. Fillebrown addressed the association in favor of the object. A general discussion of the question followed, and finally a motion, made by Dr. J. Rollo Knapp, that "it is the sense of this association that the report of the committee be adopted and that the union be effected," was voted on and was carried unanimously.

On motion of Dr. L. M. Cowardin, it was ordered that the committee be appointed to wait upon the American Association and agree upon a time to meet and effect the proposed object of union.

On motion of Dr. Gordon White, the original committee was continued, with power to act.

A paper was read by ROBERT EUGENE PAYNE, D.D.S., New York, entitled "Replantation in Pyorrhea Alveolaris, with Description of a Method for Correcting Malposed Teeth and Splinting Loose Teeth in Position until Firm;"* also a paper by ISAAC N. CARR, D.D.S., Durham, N. C., as follows:

## THE COMPATIBILITY OF DIFFERENT FILLING-MATERIALS WITH TOOTH-STRUCTURE.

The subject of this paper is not new by any means, but there are certain basic principles which should govern us in the selection of materials for filling teeth that I think are very often overlooked by the majority of us who are daily engaged in a conscientious effort to preserve the teeth of our patients. The purpose of this paper, therefore, is to discuss the question from a scientific standpoint, and endeavor thereby to arrive at some definite conclusion. The use of gold, tin, and amalgam for filling teeth is almost as old as dentistry itself, and the peculiar characteristics each possesses have been discussed many times in our society meetings; but since the histologists began their investigations on the minute structure of the teeth, and the use of the microscope by ourselves in corroborating their statements, we are enabled to discuss the subject more intelligently and from a really scientific standpoint. We must first know the internal structure of a tooth, and how it is nourished and supported. Now, what are the facts revealed to us by the scientific investigations along this line made by such men as Black, Williams, Bödecker, Heitzmann, and others? These men nearly all agree that the teeth, although apparently so solid and dense, do not differ greatly or materially from other organs of the body; the processes of waste and repair differ only in degree, and not in kind in the whole economy. We are told that water and gases make up ninety-five per cent. of the entire body, and Dr. Black, in one of his recent valuable articles, tells us that the dentin of a tooth contains nearly forty per cent. of organic matter and water, and that the only part which seems to be wanting in organic matter is the enamel, which, as we all know, is a very small portion of the whole tooth-structure, and does not therefore enter into the problem under discussion, its edges generally being the only part in contact with the filling-material.

The teeth being vital structures, are nourished and supported in the same way as all other organs of the body. This fact being recognized, the question naturally arises, "What treatment should they receive at the hands of intelligent dentists? What is the underlying principle to govern in the method employed to arrest and prevent decay?" As has been well said by another, "If the physiologist and the microscopist agree as to the structure and function, it would seem that there might be a basic or fundamental principle to determine the method of operation and the selection of tooth-stopping material. The method adopted more than a quarter of a century ago, and which is at present employed, does not accord with the teachings of the physiologist and the microscopist; it is in direct opposition to natural law. Each new discovery in the minute structure of the teeth makes this more plain; pounding the teeth with a mallet cannot be defended on scientific grounds, and yet we all do it more or less. No one would think of attempting to arrest and prevent disintegration in any other vital organ by abrasion." This leads us to the consideration of filling-materials. In regard to gold and its incompatibility as a filling-material, much has been said. Professor Flagg goes so far as to say that, in proportion as teeth need saving, gold is the worst material to use. This statement is altogether too broad and sweeping; it does not take into consideration the difference between cohesive and non-cohesive gold. There is much difference in the preserving qualities of the two. Cohesive gold resists manipulation. This resistance is due to the law that all crystalline bodies, when unobstructed, run into spherical form; the tendency is, as we sometimes say, to ball,—it being hard to keep the first piece in place unless you have a very deep undercut or retaining-pit. When you pound gold with a mallet you increase the crystallization.

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*Dr. Payne's paper appears in full at page 1005, DENTAL COSMOS for December, 1897.

As we have already observed, the dentin is a living structure made up of forty per cent. of organic matter and water. Here you have in the use of cohesive gold a crystalline body coming in contact with a fibrous one, and this being so, where, I ask, is the compatibility of the two substances? The filling-material should correspond and be in harmony with tooth-substance, and should not depend entirely upon the mechanical structure of the cavity to hold it. Wedl says that there is a substance in the interglobular space called amorphous, or structureless, substance. A filling to be in harmony with this substance should be amorphous, or structureless, in its composition; such are tin and gutta-percha. Non-cohesive gold, while not as compatible with tooth-structure as tin, makes a good foundation, a good covering for the dentin, is more or less structureless, or, as we would sometimes say, it is "dead soft," but the union between it and cohesive gold is only mechanical, while with tin, under certain conditions, it will form apparently a solid mass; and this is brought about not by interlacing or incorporating one into the other, but by affinity secured by simple contact. This combination makes an ideal filling. As to amalgam, the same argument applies as to cohesive gold. Its granular character makes it easy for it to absorb the amorphous substances in the interglobular spaces that are needed by nature to nourish the tooth,—assist in repairing the damage done by the ravages of decay.

Another objection to amalgam is the carelessness with which it is often used. Cavities are not as thoroughly prepared as when gold is used, and often there is too much mercury used in mixing. But in some respects it is a valuable adjunct, and, whatever we may say against it, we all use it, and for the reason that so many of our patients could not afford gold; and there are cavities, too, where it would be almost impossible to make a filling with anything else than a plastic. To sum up the matter in a few words, tin foil covering the floor of the cavity, with cohesive gold to finish, is the best filling-material known for permanent work. Amalgam answers a purpose, and, until we have something better that is cheap, it would be very hard to get along without it. I do not believe it compares with non-cohesive gold as a tooth-saver.

### *Discussion.*

Dr. Cowardin. I did not hear the paper on replantation as a cure for pyorrhea alveolaris; it is an interesting suggestion, and I regret that I did not hear the paper. In regard to Dr. Carr's paper on the compatibility of filling-materials with tooth-structure, the question, when properly analyzed, resolves itself simply into that of the conducting power of the material employed. Those materials are best which have the least power of conducting thermal changes; that is, they are the most agreeable; but, unfortunately, the materials which are best in that respect do not have sufficient power of resistance to attrition. I have found, as the result of twenty-three years of practice, that much depends upon the idiosyncrasies of patients. Where the teeth are extremely sensitive to excavation a non-conductive substance must be used for filling. On the other hand, there are teeth that are not susceptible to pain in excavating, hardly sufficiently so to determine that they are vital teeth, and yet within forty-eight hours after they may develop such serious neuroses as to necessitate removal of the filling. Thus, the idiosyncrasies of patients and the different character of the various filling-materials land us in a maze from which it is difficult to extricate ourselves. It should be the rule of every thoughtful operator to interpose some non-conducting substance between a conductive filling and sensitive tooth-structure. This has been my practice for the past ten years, and it is exceedingly rare that I have any after-neuroses due to thermal changes. This I attribute to the fact that I take advantage of the saving qualities of gutta-percha or the cements interposed between permanent fillings and tooth-substance. With thoughtfulness along these lines I am sure that we can accomplish the best results. Gutta-percha has a considerable range of expansion and contraction, through heat and cold in the mouth, and should therefore not be used in close proximity to the pulp. I wish to make one statement to prevent certain ideas advanced by Dr. Carr from misleading our younger members. I contend that filling teeth does not prevent decay. To fill a tooth is simply to arrest decay, not to prevent it. A filling which is perfectly adapted to the walls of a cavity will arrest further decay under proper conditions, but it must be borne in mind that, unless germicides are used in the bottom of the cavity to arrest further acid fermentation, the filling will not arrest decay.

You may fill as perfectly as you can, and polish as bright as you may, but vitiated fluids and lactic acid formation will continue to break down tooth-structure. I have a patient now who makes faithful use of antiseptics and germicides, for whom I put in fillings with all the skill I possess, but the patient is continually presenting with new cavities. So I say filling teeth does not prevent decay. As a profession we should strain every nerve, be constantly on the alert; our only hope lies in finding something that will destroy the bacteria that give rise to the fermentation that causes decay of the teeth. Not until the whole human family resolves itself into a sanitary organization, living according to nature's laws, and so keeping the organs of secretion in perfect condition, will the teeth be free from decay.

Dr. GORDON WHITE. In the past sixteen years I have had considerable experience in the treatment of pyorrhea alveolaris, and I will say that, unless you are gifted with the greatest patience and perseverance, you have very little to hope for in the treatment of pyorrhea cases. Dr. Payne has presented some interesting models, and he has evidently had very happy results and will undoubtedly prolong the usefulness of these teeth for many years. I have never known any cases of positive cure, but the usefulness of the teeth can be prolonged. I have a case in the mouth of my own mother. The left upper cuspid was very loose fifteen years ago; the anterior plate of bone was destroyed for one-half the length of the root. It has been necessary to treat it three times since that time. I had occasion to see it recently, and to-day that tooth is still in position and as firm as it became after the first treatment, fifteen years ago. Its condition was such at that time that it would have been lost within a few months but for the treatment then given. I do not believe that we can ever entirely eradicate the disease, but, with the co-operation of the patient, we can prolong the usefulness of the teeth. I have other patients who have been under my care for the treatment of this disease for ten and fifteen years. Those teeth are as firm to-day as after the first course of treatment, but, unless you can secure the co-operation of the patient and your own conscientious perseverance, don't undertake to treat pyorrhea. I use, with the most satisfactory results, the lactic acid treatment. When the roots of the teeth are very sensitive I invariably use the lactate of silver, but this offers no advantages except where the roots are very sensitive. It is not desirable to use the powder dry in the pockets, as it is not soluble in less than fifteen times its own weight of water, so that it becomes a foreign body in the pocket and is liable to produce great irritation. I used the dry powder at first, but I found that it aggravated the condition of the gums, and on examination I found lumps of lactate of silver as hard as concretions of tartar. I now use it only in saturated solution. In many cases it proves to be a most excellent remedy. I do not claim that I am always successful,—that I don't lose some teeth,—but I am not one of those who say treatment is of no use; better have the teeth out at once and wear a plate. I always hope for good results. For a number of years I have been using silk thread ligatures with great satisfaction.

The twist of the silk gives it great elasticity; it shrinks in a few hours and holds the teeth in position very firmly. I know of nothing else that is so efficacious. I have learned more about the treatment of pyorrhea alveolaris from Dr. Younger, and especially in the use of silk ligatures and the application of lactic acid, than from any one else in the world. Dr. Clements, of Mississippi, has recently given a new name to this disease, and it is not a bad one, though I do not know whether or not it is correct. He calls it hypercalcic cementosis. His article, which is a very good one, was read before the Mississippi Dental Association and is published in the *Dental Headlight*, and will be found well worth reading.

Dr. ———. Does lactate of silver discolor the tissues?

Dr. WHITE. It does to some extent, but not so much as the silver nitrate. But in our treatment of this disease more depends upon the thoroughness of surgical treatment than upon anything else. I am sorry I could not bring my little instruments with me, but they are in the hands of The S. S. White Company, who are making more of them.

Dr. G. I. FRIEDRICHS. I never could comprehend the object in this thorough removal of deposits so insisted upon, nor can I see how it can be thought possible that there will ever be adhesion again between the root and the walls of the socket when the membrane so absolutely essential to the union has been destroyed by this surgical operation. It is not possible that there can ever be re-adhesion.

Dr. B. F. ARRINGTON. I differ from Dr. White in his belief that the gum-tissue will ever reunite when once the union has been destroyed. It is simply a matter of impossibility. It can't be done. There will never be the union that there was originally. The gum-tissue may be made to contract and hug the tooth and enable it to render good service, but the gum will never reunite with the tooth. Again, it is impossible to treat this disease, and cure it, with all the remedies at our command, unless all deposits upon the teeth are thoroughly removed.

Dr. EGGLESTON, Richmond, Va. I should like to ask Dr. White if the lactate of silver is applied clear to the apex of the root; also, if it acts as well as the silver nitrate. In the pockets, do you apply it as far down as you can get it? Does it stop the formation of pus? Is there a reunion of the gum with the tooth?

Dr. WHITE. The formation of pus will not be stopped unless all the deposit is very thoroughly removed. I know that there is a contraction of the gum, if you choose to so call it, so close that you cannot pass the smallest instrument between the gum and the tooth without causing great pain. It may not be technically a union, but practically it is so. We do not remove the membrane, but only the deposits.

Dr. BEACH. There is one fixed fact to be borne in mind: tissues once destroyed by the disease known as pyorrhea are never restored. I do not wish to discourage any enthusiast, and hope something will yet be discovered that will wipe this disease out of existence. I do not think the treatment has yet been found that will make a radical cure of pyorrhea. Ten years ago I made the statement that genuine pyorrhea alveolaris was never cured, and I then offered one thousand dollars to any one who would present one case of pure pyorrhea that two years after treatment was in a perfectly healthy condition. I have never known a case to remain healthy for two years. I know of cases where progress has been checked,—the patient made comfortable. For ten, fifteen, or twenty years the teeth may be kept in a condition more desirable than if there had been no treatment. But there is a vast difference between checking the progress of a disease and eradicating it. I hope to see the day when this can be done with pyorrhea. There is a great difference between pyorrhea alveolaris and the mere presence of calcic deposits on a tooth. We all know that when tartar deposits on the necks of the teeth it exerts a destructive influence upon the pericemental membrane, causing resorption of the gums, which may present many of the characteristics of pyorrhea, but, by the removal of the cause of irritation and keeping the teeth in a reasonably cleanly condition, the gum will heal of itself. Pyorrhea is a very different thing from the mere presence of calcic deposits. We may have deposits on the teeth in pyorrhea, but the deposits do not constitute the disease. Dr. Cowardin said that filling teeth does not prevent decay. I would like him to explain whether he refers to the prevention of decay where the tooth has been filled, or in some other locality?

Dr. Cowardin. I said it does not prevent decay; it arrests it.

Dr. Beach. For how long?

Dr. Cowardin. That depends upon the hygienic condition of the mouth.

Dr. Beach. If it is arrested for forty years?

Dr. Cowardin. I said that we must be on the *qui vive* for something to act as a positive germicide.

Dr. Beach. He said there was a very fine point there. Well, if I can *arrest* decay for forty years I am satisfied with that. But if it is to be for only a few months, then I am not satisfied. I say that filling will prevent, does prevent, decay. There are some gentlemen here who have seen teeth that were filled thirty or forty years ago, and that are doing good service now. The teeth were decayed then; any further decay has been prevented. The tooth was put in such a condition that it was not so liable to decay as it was before it was filled. I fill teeth to prevent any further decay in that locality.

I must protest against the practice of lining cavities with cement to prevent them from being affected by thermal changes in case of sensitive dentin. When the pulp is nearly exposed it is the worst possible practice; if anything, I would interpose something between the thin layer of dentin and the cement. It eliminates phosphoric acid and affects the pulp injuriously. Cement is not fit to go next to the dentin when the pulp is nearly exposed. Gutta-percha is much better. From its resinous nature, pine tree resin, in a refined state, mixed with chloroform or alcohol, and spread thickly in the bottom of the cavity, is still better; then you can put cement over that. It is not susceptible to thermal changes; it is impenetrable by gases. As a therapeutic agent there is nothing equal to tin foil; it is too soft to resist mastication, but it is an excellent lining for cavities to be covered with gold.

Dr. COWARDIN. I rise to a question of personal privilege. The gentleman misrepresents. I could not in the limited time allowed me cover the whole ground, and I did not allude to pulp-capping. It is self-evident that I would not advise putting cement in close proximity to the pulp. I do not wish that to be understood as my idea by any means. I hope my remarks did not convey the idea that I would place it in close proximity to the pulp.

Dr. J. P. CORLEY. After all that has been said I do not consider the treatment of pure pyorrhea so very difficult. You have only to extract the tooth, and you cure it every time. But I do not claim the gentleman's thousand dollars for giving this method of treatment, nor do I mean to say that I extract the teeth in every case of pyorrhea. What is the definition of pyorrhea, and what does he consider *a cure?* To cure, must we absolutely obliterate the footprints of the disease?

Dr. BEACH. It must be eradicated to the extent that it does not return within two years.

Dr. CORLEY. If the physician was required to keep his patients well for two years after curing them of typhoid fever, I do not believe we would have many doctors.

(To be continued.)

## QUONEHTACUT DENTAL CLUB.

THE fifty-third anniversary of the discovery of anesthesia by Horace Wells was observed by the Quonehtacut Dental Club, of Hartford, Conn., with a banquet and annual meeting on Saturday evening, December 11, 1897. At the banquet the guest of the club, Dr. George L. Porter, of Bridgeport, made a brief and eloquent address upon the value of the discovery of Horace Wells and accrediting him with the full honor that belongs to him. The election of the officers of the club resulted in the choice of Civilion Fones, of Bridgeport, as president, in place of E. S. Gaylord, of New Haven. The other officers chosen are the same as last year: C. C. Barker, of Meriden, vice-president; C. McManus, of Hartford, secretary and treasurer. The members of the club present were R. W. Browne, New London; C. W. Strang, Bridgeport; J. T. Barker, Wallingford; G. L. Parmele, Hartford; J. McManus and H. McManus, Hartford; W. J. Rider, Danbury; C. P. Graham, Middletown; A. W. Crosby and E. Prentiss, New London. Major C. T. Wells, of Hartford, son of Dr. Horace Wells, was a guest of the club.

# DENTAL SOCIETY ANNOUNCEMENTS.

## VERMONT STATE BOARD OF DENTAL EXAMINERS.

THE Vermont State Board of Dental Examiners will meet at 10 o'clock A.M. on Wednesday, March 16, 1898, at Hotel Berwick, Rutland.

GEORGE F. CHENEY, *Secretary*,
St. Johnsbury.

## MASSACHUSETTS BOARD OF DENTAL EXAMINERS.

THE Governor of Massachusetts has appointed Dr. George A. Maxfield, of Holyoke, Mass., a member of the Massachusetts Board of Dental Examiners, in place of the secretary, Dr. E. V. McLeod, of New Bedford, deceased.

## LOUISIANA STATE DENTAL SOCIETY.

THE Louisiana State Dental Society will hold its annual meeting in New Orleans, La., February 23, 1898.

WALLACE WOOD, JR., *Secretary*.

# EDITORIAL.

## LAW VS. ANARCHY.

OUR esteemed contemporary, the *International Dental Journal*, publishes a communication in its November issue in the form of an "Open Letter," on the subject of Examining Boards,* and the editor of that journal devotes considerable space to favorable comment upon the views expressed therein.

As we hold views contrary to some of those set forth in both the essays alluded to, we here take the liberty of briefly discussing a few of their main points.

The writer of the "Open Letter" is not in sympathy with the wording of the Pennsylvania dental law, because "it will tend to strengthen and perpetuate dental examining boards beyond, in all probability, a period of usefulness and the reform and good they were designed to accomplish." He says, "When dental examining boards were created, they were deemed essential as a stimulus to dental college faculties to be more exacting and stringent with candidates for graduation, that they might send graduates forth to practice better qualified than by the prevailing custom," and he admits that this result has been in part accomplished.

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*Examining Boards: an Open Letter. By B. F. Arrington, Goldsboro, N. C.—*International Dental Journal*, November, 1897, page 729.

He thinks, now that the impetus derived from the source named has been given, the tendency toward higher planes of action is capable of continued activity without further stimulus of the same sort, and asks, "Is there any further need of such organizations?" and answers the question negatively. In other words, the stimulating and elevating effect of the examining boards has ceased to be necessary; the colleges collectively, under their purifying and elevating influence, have reached a point where they graduate only those competent to enter upon the intelligent and honorable practice of their profession. This being the case, the colleges may be henceforth confidently left to their own devices.

Does any man believe this to be a true picture of the situation, or a safe basis for dental education to rest upon? If so, let him practically investigate the problem, for he needs enlightenment. The proposition to do away with examining boards is a proposition to do away with legal restraint; to do away with legal restraint is to establish anarchy. Are we ready just yet, are we sufficiently advanced toward perfection in our social relationships to remove the barriers which are a restraining force upon human greed and the desire to get something for nothing? Certainly, whenever in other departments of human endeavor these elements have been and are working harm, the limiting forces of legislative enactment have more or less effectively been brought to bear upon them; and it is admitted that up to a certain point these same forces have been of benefit to dentistry. We are asked now to dispense with them; the educational institutions of dentistry having, through the influence of dental laws, become converted from the error of their ways, may be trusted to continue in the paths of rectitude henceforth. We are frankly of the opinion and belief that such a view is not in accordance with the facts as they exist, for the simple reason that the element of commercial competition among colleges is as strong to-day as it ever has been,—even stronger, perhaps; and so long as the financial resources of teachers are dependent upon the sizes of their classes, so long will the temptation to graduate incompetent men exist.

It is not only the constitutional right, but the duty of the state to prescribe the standard of qualification of those who are caretakers of the public health; and to that class the dentist belongs. Every civilized nation on the globe recognizes that fact, and has enacted dental laws in accordance with that principle. In this country the autonomy of the several states causes complexity in the practical carrying out of the principle, because of the present differences in state standards. The result is a regrettable lack of uniformity; but the underlying principle is the same in each case, and is universally recognized the world over.

When it is proposed, then, to abolish dental examining boards, is it meant to do away with the legal principle upon which they are based, or to substitute some other device for securing proper educational standards? If the writer of the "Open Letter" is advocating an anarchistic policy with respect to dental education, we would suggest that the time is not yet ripe for it in dentistry, any more than in the social system at large. Our evolutional progress has not yet brought us in sight of the millennium. His alternative device that the colleges be permitted to graduate men at their discretion, without legal supervision or restraint, and that a board of censors be created in each state having power to debar graduates from practice who have been guilty of malpractice or improper professional conduct, is merely transferring the power to other hands, and working a greater injustice to a class of men who should have been prevented at the threshold of their careers from entering upon practice at all.

But we are inclined to the view that both in the "Open Letter" and in the editorial under consideration the point of criticism is not the principle back of existing dental legislation, but rather with the ways in which it has been practically carried into effect. We are in full agreement with the vigorous protest of the editor of the *International Dental Journal* against the autocratic use of legal power by state boards, to the detriment of the qualified student or his Alma Mater. We are on record for our protest against the assumption of power by a so-called National Association, in the attempt to prescribe and control the methods of dental education adopted and pursued by the colleges of this country. But these again are questions of the method of application, and not the principle of dental legislation.

The editorial asserts, "There is as yet no method devised to prove the competency of the men who constitute the boards, nor is there any means provided to restrain them from rendering unjust decisions. They are practically a law unto themselves, with no supervising power to control their actions." This statement is not wholly correct. It is true that it fairly represents a generally existing condition, but the present dental law of Pennsylvania contains provisions devised to meet the objections quoted, and it does meet them fully. The competency of the men constituting the Board of Dental Examiners of Pennsylvania will, if such proof be needed, be proven by the records of their work which are open to the inspection of the public in every detail. They are restrained from rendering unjust decisions by the same device,—that of making the court of public opinion the tribunal before which all of their work is reviewed. And for the same reason they are not a law unto themselves, for the same court of public opinion is a supervising body, having greater power than any civil organization. It is true that the Board is created "mainly for the purpose of re-examining graduates from colleges," and in so doing it performs a beneficent service not only to the people of the Commonwealth of Pennsylvania, but to the colleges within its borders by Hall-marking the product of those institutions which are honestly striving to competently educate the men to whom they award their diplomas.

Let us make no mistake in regard to this vital question by assuming that because some legislation is faulty, therefore all legislative effort is bad. The salvation of our educational system depends upon the enactment of such legislative safeguards as will conserve our higher ideals and prevent the licensing of practitioners who are a disgrace to their calling, not in petulantly abolishing all legal restrictions because certain attempts at legal control have been ill-conceived and defective.

The dental law of Pennsylvania stands alone in the thoroughness with which it conserves the rights and interests of the applicant for license, and it solves the problem of competency in the Board as well as of the fairness of their work. Under such a law the colleges are stimulated to the performance of their best endeavor in preparing students for the state board examination; the competition becomes primarily one of excellence of method, not of commercial results. Where the prescribed standard is adhered to in the educational process of the schools, the board examination is simply a verification of the fact that the educational processes employed are what they profess to be. And of this, as in all the work of the board, the public at large is the final judge.

Much has been said and not a little written about the antagonism between the Faculties and Examiners Associations. When the matter is closely examined, it will probably be found that, as in all organizations, there are in each of them two contending elements,—viz. that class who are committed to advancement and elevation of standards, and that other class who, animated by motives of selfishness in some of its protean forms, antagonize the activities of the more progressive class. Whatever of antagonism may have developed between the two associations we believe is largely due to the cross-action of the two classes of individuals alluded to, which have their representatives in both bodies. And we further believe that harmony will be restored by a fusion of interests, a concert of action by the more progressive and liberal-minded members of both associations in a united effort to eliminate the many objectionable features of prevailing dental legislation, and an agreement as to the best methods of advancement possible under existing conditions. The national control of dental education without uniformity of state legislation is an impossibility. Reform of our dental laws is then the first step to be taken. The process will be necessarily tedious, but it is the only way, and must be accomplished on uniform lines before harmony can be assured. Once established, a uniform educational standard and the universal interstate recognition of dental licensees will be the certain and logical result.

# OBITUARY.

## DR. THOMAS W. EVANS.

THOMAS W. EVANS, M.D., D.D.S., the world-renowned American dentist, died in Paris, France, after an illness of twenty-four hours, of angina pectoris, November 14, 1897, in his seventy-fourth year. The portrait which we print as a frontispiece to this issue is from a photograph taken of him during his recent visit to America, and is probably the last one for which he sat.

Dr. Evans was born in Philadelphia, Pa., December 23, 1823, of humble parentage, and was one of three brothers. The eldest, Rudolph, established himself in the wholesale drug business in Washington, D. C., from which he retired after a successful career. He is still living at the age of eighty years. The second brother, Theodore, a dentist, died in Paris in 1890, after having amassed a fortune both in this country and in Europe. Thomas W. Evans, the youngest brother, received a common school education, and at the age of fourteen entered the employ of Joseph Warner, a gold and silversmith of Philadelphia, whose business included the manufacture of certain surgical instruments and incidentally of plate, solders, and some of the implements used by dentists. His apprenticeship with Warner brought him into occasional contact with dentists of that period and their methods, and in this way he no doubt derived the impetus which led him later to enter upon the study of dentistry as a profession. In 1841 he became a student in the office of the late Dr. John DeHaven White, of Philadelphia, with whom he remained for two years. During his studies with Dr. White he attended lectures at Jefferson Medical College, from which, in due course, he graduated.

He practiced his profession for a time in Maryland, and later, in partnership with Dr. Philip Van Patten, at Lancaster, Pa., with whom he remained until 1847. It was during his stay in Lancaster that Dr. Evans performed a series of gold contour filling-operations which he exhibited at the annual exhibition held under the auspices of the Franklin Institute in the fall of 1847, and for which he received a gold medal in recognition of the novelty and merit of his work. Dr. C. Starr Brewster, an American dentist practicing in Paris, had his attention called to this work done by

Dr. Evans, and was so impressed by it that a partnership was arranged between them.

Accounts differ as to how the association of Dr. Evans with Dr. Brewster came about. One version states that Dr. Brewster saw the work at a fair held in Lancaster, another that it was at the Franklin Institute exhibition in 1847 that Dr. Brewster's attention was attracted to it. The *Dental News Letter* of October, 1848, contains the following note regarding the point in question:

"And now we have another American dentist (a native of Philadelphia) in Paris. We speak of Mr. T. W. Evans, specimens of whose plugging were exhibited at the exhibition of the Franklin Institute in the fall of 1847, which secured him a medal, and drew forth many commendations as to the skill of the operator. On his arrival in Paris he waited on Dr. Brewster, who, after examining his specimens, immediately offered him a partnership, with flattering prospects, which offer was accepted, and Mr. Evans, we are informed, is now a partner of Dr. Brewster."

The partnership between Drs. Brewster and Evans lasted until 1850, during which year he opened an office on his own account in the Rue de la Paix, and entered upon a professional career which was as wonderful as it was unique.

Dr. Evans has been generally credited with being the pioneer American dentist in Europe; this is an error. As already shown, Dr. Brewster for one had preceded him by many years, and was in successful and lucrative practice at the time of Dr. Evans's arrival. Dr. E. Maynard, of Washington, had also preceded Dr. Evans, but did not permanently locate, though he helped to make American dental methods known in Europe. But though in point of time Dr. Evans was not the first, it is certain that he brought to Europe a combination of personal characteristics and special technical ability which not only made him a conspicuous figure, but gave an impetus to dental practice and a status to its representatives before unknown.

Dr. Evans as an operator may have had many peers, and in recent times many who excelled him as a practitioner. There are not wanting those who place but light estimate upon his abilities as a dentist, and who attribute his phenomenal success to abilities quite apart from his skill as an operator. There is, however, evidence tending to show that he was an operator of more than usual ability. Gold filling work done by him during the period of his practice in Lancaster, Pa., was reported as in good condition twenty years later, and the fact of his exhibition work attracting the attention of so skilled an operator as Dr. Brewster and impressing him as it did must tend to confirm a high estimate of his operative skill. In any consideration of his abilities as a dentist, his work should be studied in comparison with the prevailing state of the art at the period when his best results were accomplished.

As Dr. Evans was but an infrequent contributor to the periodical literature of his profession, the published records of his work are meagre; such as they are, however, they clearly show originality of thought and fertility of resource in a marked degree. In the early part of 1849 he published in the *Lancet*, the *Dental News Letter*, and elsewhere an account of his amalgam alloy containing cadmium as an ingredient, which account gave evidence of a careful observation and study of the peculiar physical properties.

especially that of malleability, which the addition of cadmium conferred. It is worthy of note, and especially creditable to his honesty of purpose, that the inventor of this alloy was the first to observe and report upon the deleterious chemical effects upon tooth-structure produced by this combination, due to its contained cadmium. In October, 1849, he withdrew his recommendation, published a note of warning concerning it, and later abandoned its use. He was among the first to study and practically develop the applicability of vulcanized rubber as a dental base-plate. It is not certain that he made the first denture on the vulcanite base, but he was at least among the first. During his recent visit to America he carried with him and exhibited with pride a black vulcanite cane which he stated was the result of one of his earliest experiments with the material, and the largest single piece of vulcanite which up to that period had been produced.

He was an occasional contributor to the *Dental News Letter* during its period of publication, but his articles were rather in the form of professional correspondence than of formal essays. In 1853, however, he contributed a lengthy paper upon "The Regulation of the Teeth," which contains, beside much unrelated matter, detailed accounts of the author's methods for correcting a number of the commoner kinds of dental irregularity. A careful study of this paper shows a fairly successful attempt at a classification of dental malpositions, and very great ingenuity in the devising and construction of regulating appliances. He made practical application of the elastic force of hard-drawn gold wire as a source of power in tooth-movement, and used anchor bands in a manner closely simulating the more modern methods of to-day. The general principles of tooth-regulation set forth in the essay in question will bear favorable comparison with those now in vogue and which are considered orthodox.

The foregoing features of some of his contributions to dentistry through its literature are adduced not to call attention to his work as a writer, but to emphasize what is clearly a fact: that he possessed much ingenuity and flexibility of resource, and was far beyond the average of practitioners of his time in point of general ability.

As a writer he was faulty; his articles were stilted in style, verbose, and lacking in force. Although he has figured in other directions as a writer, the same faults of style characterize all of the work known to have been his own.

His professional equipment in itself cannot by any means be regarded as the cause of his phenomenal success. His abilities as a practitioner were merely a contributing factor in a complexus of characteristics which have all helped to make Dr. Evans the most conspicuous figure connected with dentistry. Dentistry was but the stepping-stone which served as a means for bringing him into contact with those to whom he made himself of value and who could contribute substantially to his success. He was a born diplomat, possessing a keen perceptive faculty which enabled him to read and correctly understand human nature, delicacy and firmness in his treatment of affairs, a rigid honesty of purpose, and a foresight which was intuitive. In short, he knew how to make the best of his opportunities, and in some degree create them. His association with Dr. Brewster brought him into contact with the aristocratic element of French society. It was his avowed ambition to secure for his clientèle all of the crowned heads of Europe, and it has been asserted that in this he succeeded. By his skill and attractive personality he drew them to him and won their confidence. His confidential relationship with Napoleon III has become historical, and its two most important results,—namely, the diplomatic mission intrusted to him by Napoleon to President Lincoln during the war of the rebellion, which resulted in the neutrality of France with respect to that issue, and the aid rendered by him to the Empress Eugenie in her escape to England during the riots following the fall of Sedan at the close of the Franco-Prussian war,—are matters of common knowledge. As to the latter event, Dr. Evans, during his recent visit to America, gave the following version to a friend in Philadelphia:

"It was on the night when the infuriated mob had fired the Tuileries that Eugenie, in disguise, fled for her life, and, while the royal residence was burning, made her way to the residence of the doctor, who was not at home at the time. When he returned he found her in the library.

" 'Doctor,' said the Empress, trembling with emotion, 'there are few persons in Paris to-day in whom I can trust. The people are shouting for my blood. They want to place my head on a pike, as they did with the head of Princess Lamballe; but, Doctor, I am sure I can trust you. I know the great peril that my appeal will cause both Mrs. Evans and yourself. You might lose all you have, but, oh, if you can only assist me to escape from Paris and France!'

"The doctor assured the Empress that both Mrs. Evans and himself realized what they owed to Napoleon and herself, and at once offered his hearty co-operation at any cost. He assured her that he had unlimited confidence in his servants, and particularly in his coachman. Then he bade her to be calm while he was absent to arrange her escape. He jumped in his carriage and drove to the barricades on the outskirts of Paris. He was known as the English doctor, and when he was stopped by a sentinel and challenged he replied that he had a patient a little way out of Paris and was in haste to answer an urgent call. The sentinel was satisfied, and let him pass, calling out that he wished the doctor would get a good fee.

"Thus he assured himself of the ease with which he could pass the lines, and in a short time returned. He then told the sentinel that he had to return to Paris for medicine and instruments. Upon inquiring if that particular sentinel would be on duty long, the doctor learned that he would be on guard until after midnight. With the caution that if the soldier would meet him there shortly before midnight he would receive two boxes of the finest cigars made, as well as a bottle of the best brandy on earth, the doctor drove on, re-entered Paris, and informed the Empress that he was ready for the venture.

"With Eugenie crouching down under a skillfully arranged shawl on the bottom of the carriage, the perilous journey was attempted. Reaching the sentinel, who was there ready for his brandy and cigars, the doctor leaned out of the carriage, with the boxes in one hand and the bottle in the other, thus completely hiding the trembling form of the Empress. With a cheerful remark to the soldiers, the doctor ordered the coachman to hasten on, and the danger for the time being was over. Then began the furious drive for Calais, where the Empress boarded a vessel without attracting suspicion, and sailed for England."

Dr. Evans has been accredited with the possession of vast wealth, and doubtless correctly so, but its amount has probably been greatly overestimated. One who can speak with authority says, "It has been stated that Dr. Evans owed his fortune to the patronage shown him by Napoleon III. This is not wholly true. It is a fact that the doctor's reputation was greatly enhanced by the confidence of the French Emperor, and that his list of patrons was greatly enlarged as a result, but by far the greater portion of his accumulated wealth was due to the real estate investments made possible through the personal friendship of the Emperor."

The disposition of his property is still a matter of conjecture, and public interest in it centers largely in the possible charitable and educational bequests that may have been provided for in his will. During his recent trip to America, which he visited for the purpose of bringing his wife's remains to her native city for burial, he expressed the intention of endowing certain charitable and educational institutions, among others a dental college, but in all probability his sudden demise occurred before he had executed his will to that end.

Much of Dr. Evans's life was devoted to works of charity and philanthropy. He rendered important service during the Crimean and Franco-Prussian wars in the care of wounded soldiers, and in introducing more sanitary and humane methods in military hospitals. Sent by the Emperor at his own suggestion, during the Crimean war, to study the sanitary condition of European camps and hospitals, he was so impressed by the pictures of misery and suffering there presented to him that on his return he secured the interest of the civilized world in important measures of reform. His record during the late civil war in the United States will be found in the history of the United States Sanitary Commission, which he organized in Philadelphia, coming over especially to serve his native land in the hour of need. During the Franco-Prussian war he was probably the only man in Europe who might pass from camp to camp. During all this memorable campaign he personally directed the movements of the ambulance corps of the Red Cross Society.

It was the elements of character which led him to undertake such work and the associations which it made for him that more than all else contributed to his reputation and material success. Throughout his whole career he never forgot, and indeed constantly emphasized, two facts: first, that he was an American; and that he was a dentist. In his loyalty to his profession he was steadfast; his faith in its possibilities was unfaltering; he was always the champion of high professional ideals. The principles which animated his professional life he manifested from the beginning of his work, and were in marked contrast with those of many of his early confrères. In a communication written soon after he located in Paris he said, "I may have but little to impart, yet that little is at the service of each and all members of my profession; and gladly would I hail the day that should make all that is sound in science and valuable in art common property. . . . By the discussion of subjects connected with the profession and by the contribution of each according to his ability, by the comparison of the different modes of practice and the making known all new discoveries and improvements, we shall place the profession on more commanding ground, and better serve the generation in which we live."

That his professional life was lived in harmony with these principles the results show. The measure of success which he attained was not limited to material acquisitions, but was extended to the elevating influence which he exerted upon the general status of his profession. He lived to see his chosen calling placed upon more commanding ground, and the value of its ministrations to his generation substantially recognized.

That his life-work was a large contributing factor to that end cannot be doubted, and when all of the factors which have helped in the advancement of the professional status of dentistry are fairly estimated, the influence of the life of Thomas W. Evans will be among the greatest.

## DR. HARRISON ALLEN.

Dr. Allen died suddenly at his home, in Philadelphia, November 14, 1897, of angina pectoris, in the fifty-sixth year of his age.

He was born in Philadelphia in 1841, and received his early education in the public schools of his native city, graduating from the Central High School in 1856. He pursued his medical studies at the University of Pennsylvania, from which institution he graduated in 1861. He passed the army medical examination and obtained a surgeon's commission. After doing some field service he was assigned to duty at Mount Pleasant Hospital in 1863, and when only twenty-four years old was surgeon-in-charge of Fairfax Seminary Hospital. He resigned in 1865 with rank of brevet major, and was appointed professor of zoology and comparative anatomy in the Auxiliary Department of Medicine just then endowed by the late Professor George B. Wood, which position he held until he succeeded the late Francis Gurney Smith as professor of physiology in the Department of Medicine of the University of Pennsylvania, in 1878. From 1866 until 1878 he held the chair of anatomy in the Philadelphia Dental College.

In 1883, owing to the increasing demands of his private practice, he resigned his chair in the University, but on the death of Professor Leidy, in 1891, Dr. Allen tendered his valuable services to the University and accepted the chair he had originally filled in the Auxiliary Department of Medicine. His services were further employed in developing original research work in anatomy among graduates and advanced students, and as director of the Wistar Institute of Anatomy. In 1894 the demands of private practice compelled him to relinquish his professional work. Dr. Allen served upon the surgical staff of the Philadelphia Hospital from 1874 to 1878, of Wills Eye Hospital, 1868–1870, and of St. Joseph's Hospital, 1870–1878. He was connected with many learned and scientific bodies, prominent among which he held membership in the Academy of Natural Sciences, Philadelphia; the Boston Society of Natural History; Biological Society, Washington; the Pathological Society of Philadelphia, Philadelphia County Medical Society, American Laryngological Society, Neurological Society of Philadelphia, Historical Society of Texas, American Association of Anatomists, Anthropometric Society, Society of Natural Sciences, Chile, in many of which he had from time to time held official positions. He was one of the judges of anthropology at the World's Columbian Exposition, in 1893.

Dr. Allen was in its broadest and highest sense a scientist. Though widely known and successful as a practitioner of general and special surgery, his reputation will have its most enduring basis in the scientific work he accomplished, and this notwithstanding the fact that his skill as a practitioner in the treatment of the upper air passages had won for him the title of the "father of rhinology." His published contributions to scientific literature in the domain of biology number upward of one hundred, and all evince the painstaking, earnest endeavor of the profound seeker after the truths of nature. His valuable results and his attractive personality brought him into close contact with the leaders of science in his chosen fields. It has been truly said of him, "The breadth of his sympathy with everything that pertains to science and scholarship impressed at once all who came in converse with him, and the modesty which led him so often to take the attitude of a learner where he might have spoken authoritatively was one of his most marked characteristics."

Dr. Allen's interest in scientific odontology was alwavs active. Communications from him which have occasionally appeared in these pages have been of value not only in the information they conveyed, but in directing attention to the importance of a scientific study of the mouth and its contained organs. Just previous to his death, Dr. Allen presided at a meeting commemorative of the late Professor Cope, with whose life-work he was in closest sympathy. The loss to science of these two distinguished savants is one which cannot be estimated and cannot be repaired, unless, mayhap, the splendid examples which each in his way has furnished may serve as the stimuli which will raise up those who can follow out the lines of thought their genius has served to materialize.

## DR. EUGENE V. McLEOD.

DIED, at his home in New Bedford, Mass., on Wednesday, November 24, 1897, after a brief illness, EUGENE VELORY McLEOD, D.D.S.

Dr. McLeod graduated from the Boston Dental College at the commencement held March 5, 1872, on which occasion he was one of the speakers; and in 1873 was elected president of the Alumni Association of his Alma Mater. He was for many years also one of the staff of instructors of the same institution. His interest in all that concerned the welfare of his profession was active and genuine from the beginning of his career. He was an active member of the Massachusetts State and Northeastern Dental Societies. In 1887 he was appointed by the Governor a member of the Massachusetts Board of Registration in Dentistry, and was reappointed by succeeding Governors as his terms expired; so that his membership in the Board was continuous from the date of his first appointment until his death, covering a period of nearly eleven years. During the entire period of his service he acted as secretary of the Board. Of his relations to the Board and his personal characteristics, one of his colleagues says, "In my association with him during the entire term of his service, I learned to appreciate his worth as a man and a dentist. His was a lovable and amiable disposition always and under all circumstances, displaying a tenderheartedness which will never be forgotten not only by his associates on the Board, but by the hundreds of young men who appeared before him for examination, and for whom he had ever an encouraging word, showing a personal interest in the welfare and advancement of each one. In the delicate work of examination he displayed fairness, judgment, and discretion. His duties as secretary were a great tax upon his busy life, but he gave his valuable time cheerfully and, in most instances, gratuitously to the state, giving close attention to the most minute details of the work. He was a believer in progress, and always active in furthering the best interests of his profession. His death occasions a great loss to the Board, the state, and to dentistry."

We cannot add anything to this estimate of Dr. McLeod, further than to certify to our belief in its accuracy. His was a rare character, full of human kindness and that combination of gentleness and force, of earnest endeavor and steadfast integrity, which, when found and recognized, strengthen our faith in all humanity.

Dr. McLeod was married May 14, 1895, to Miss Helen R. Edwards, of Fairhaven, Mass., who survives him.

The following resolutions, by his colleagues of the Board, were passed at a special meeting held for the purpose:

WHEREAS, In the sudden death of Dr. E. V. McLeod, which occurred November 24, the Massachusetts Board of Registration in Dentistry has lost one of its original members who, during its existence of eleven years, has served as secretary;

*Resolved*, That in the death of Dr. McLeod the Board has sustained the loss of one who has been most efficient and faithful to its duties, giving an immense amount of time to its work;

*Resolved*, That as an examiner he displayed wisdom and discretion, and wonderful tact in dealing with men;

*Resolved*, That in his contact with his associates on the Board his kindliness of nature and generosity of heart will always be remembered with the warmest affection;

*Resolved*, That we extend our sincere and heartfelt sympathy to his bereaved widow in this her great affliction;

*Resolved*, That these resolutions be entered on the records and a copy be sent the widow of the deceased, and to the several dental journals for publication.

(Signed by John F. Dowsley, Geo. E. Mitchell, Thos. J. Barrett, Dwight M. Clapp.)

# PERISCOPE.

REMOVAL OF TEETH FROM RUBBER PLATES.—It sometimes falls to one's lot to remove teeth from an old rubber base. It is common to proceed by holding the plate over a gas-jet until the teeth can be pried off, and in doing so operators seem to forget that the odors of $H_2S$, $SO_2$, and other gases have found their way to the remotest corner of the room, and possibly to adjoining premises. This might be avoided by boiling the plate for a few moments, when the rubber will be found yielding, and by grasping it with the pliers the rubber may be sprung from the teeth, and a few repetitions will complete matters.—*Ohio Dental Journal.*

DENTAL "WAX."—Take of French chalk, fourteen parts; gum kauri, eight parts, and stearin, four parts. Melt the stearin on a water bath, then add the finely powdered gum kauri in small quantities. When dissolved, sift in slowly the French chalk, and stir constantly till cold. The composition can be colored with carmin if desired.—*Pharmaceutical Journal.*

A SUBSTITUTE FOR ARTICULATING PAPER.—When correcting an articulation one may some day be caught without articulating paper; to remedy matters, take a little thin paper, wet the finger with a little alcohol or water, and rub on a little polishing-rouge. This dries quickly, and takes but a few moments' time to prepare.—*Ohio Dental Journal.*

TO RETAIN RUBBER-DAM.—Dr. Bergstresser uses sandarac varnish instead of the painful silk ligature. He says this is a most valuable method, and that if the plan has not been universally adopted, it ought to be.—*British Journal Dental Science.*

# PUBLISHER'S NOTICE.

## WHY READ THE DENTAL COSMOS?

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THE S. S. WHITE DENTAL MFG. CO.

# HINTS, QUERIES, AND COMMENTS.

TREATMENT OF CARIOUS APPROXIMAL SURFACES.—The treatment of carious cavities in approximal surfaces of bicuspids and molars is subject to so many modifying conditions that no fixed rule applying to all cases can be followed. Some cardinal principles should be observed,—first and greatest in importance is the object in filling teeth, which is, or should be, to preserve them; not to display our skill as dental jewelers, or to enrich ourselves at our patient's expense. Therefore, if the patient is young, or the tooth is soft, or the cavity deep, the excavating should be carefully done around the margins, leaving plenty of the leathery decay as a natural capping and permanent protection to the pulp, with the assurance that kind old Dame Nature will recalcify much tooth-structure which has been softened by decay if assisted a little and given a chance by protecting the parts with an antiseptic cement made by incorporating one-fourth by bulk of hydronaphthol powder with the zinc oxid of our common oxyphosphate cement; first having bathed the cavity with twenty-five per cent. alcoholic solution of hydronaphthol and drying it out. A greater per cent. of bicuspids are found missing or with devitalized pulps than any other teeth, as a result of delayed or unwise treatment; therefore conservatism in their treatment cannot be too strongly urged. Allowing that the tooth is in condition for permanent filling, the cavity should be so shaped as to bring buccal and palatal margins well out from between and away from possible contact with adjoining teeth, that the margins may be automatically or self-cleansed; the cervical margin should be cut to or below the gum line; the masticating margin cut through the fissure forming dovetail anchorage for the filling, which should be compound. The cervix or floor should be cut flat or slightly beveled outwardly and grooved for anchorage; perpendicular walls should be grooved sufficiently to retain the filling; the cervix should be filled with tin and gold foil, No. 4 gold and No. 4 tin folded once together. A matrix should be used in every case, placed loosely at the cervix at first to allow the tin and gold to swell out over the margin, that part being filled more than full that it may afterward be burnished and finished back to exact flush. The bulky portion of the cavity may be filled with soft or semi-cohesive gold, or if on a distal surface with tin and gold. The filling should be completed with cohesive gold contoured to natural form, and burnished and polished to perfection.—SIDNEY S. STOWELL, D.D.S., in Symposium at Northeastern Dental Association.

A PECULIAR CASE.—I had occasion to administer chloroform to a lady, Mrs. S., about forty years of age, for an operation in the oral cavity. It took about the usual quantity to produce anesthesia. After the operation the patient continued drowsy for half an hour, but with no unfavorable symptoms. Just before leaving the office she informed me that she had taken chloroform several times before, and for several weeks succeeding she regularly fell asleep each day at the same hour of the administration. She expressed the determination to resist the sleep this time. On seeing her again, a few days after, she told me that in spite of all her efforts she went fast asleep, continuing thus for an hour. I have mentioned this case to several friends, who are physicians, but none of them have ever heard of a similar case. I judge that she would be an excellent subject for hypnotic experiment, and suppose that the chloroform produces the phenomenon of "suggestion" as in hypnotism.—E. P. BEADLES, D.D.S.

To the Editor of the Dental Cosmos:

*Sir,*—I desire information from older members of the profession, through the columns of the Cosmos, concerning a case of replantation which has recently come under my care. The patient is a male, middle-aged, strong and robust.

The tooth in question, a lower left lateral incisor, perfectly sound, had become so loosened by deposits of calculus, the labial aspect of its root so completely denuded and the gingivæ surrounding it so inflamed that the tooth finally became loose, and so annoying that the patient himself extracted it. He brought it to me, and I decided to attempt replanting it.

Now what I wish to know is this—will the fact that the labial wall of the *alveolus* is *absent*, have anything to do with the ultimate success or failure of the operation?

In all my reading I have never encountered a similar case, and perhaps by considering this query there may be, who knows, some new light shed upon the theories concerning the bond of union which is set up between the cementum of an extracted and replaced tooth and the wall of its alveolus.

Yours sincerely,

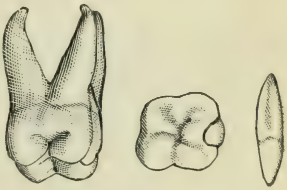
Ipswich, Mass., December 10, 1897. G. W. Gilbert.

To the Editor of the Dental Cosmos:

*Sir,*—With this I send drawings of a supernumerary tooth that I think interesting from its position in the arch.

Mr. D., aged twenty-five, called to have his teeth put in order. All the back teeth were in good condition, except that at times he felt some pain in his right upper first molar.

This tooth, as will be seen by the illustrations, was a very large one, with more than the usual number of cusps. Between what I may term the buccal cusp and the main body of the crown was a dark line, and on examining it I was able to pass a fine exploring instrument into what I at first thought was a fissure. He winced, and I then found that what I thought to be a buccal cusp was loose. After working at it a little I loosened it so much that I decided to remove it, and did, when I found it to be a supernumerary tooth.



The molar itself was free from decay or blemish. If the supernumerary had remained it would have certainly invited caries, which my fortunate discovery of its being loose and removing it has prevented. The tooth removed is perfect in formation and of a tusk-like shape, as the illustration shows.—William H. Mitchell, D.D.S., Bayonne, N. J.

Articulation and Occlusion.—The correct dental uses of these words seem somewhat dubious in the minds of many writers on dental subjects. In the 1896 report of the American Dental Association Committee on Nomenclature it is said that, "The meeting of the masticating surfaces of the upper and lower teeth is frequently spoken of as an articulation; it is more accurately described by the word occlusion." Would it not be more exact to use the term occlusion to describe the mere meeting of a lower tooth with an upper tooth, or of lower teeth with upper teeth, and when the antagonizing, opposing, or impacting teeth meet in their normal break-joint relations to each other, describe the result by the term articulation? The appliance aiding in the production of proper relations of occluding artificial teeth may therefore be correctly termed an articulator.

It must thus be obvious that simple contact of the occlusal surfaces of teeth in the mouth may or may not be articulating contact, but the process of proper mastication requires the *occlusive articulation* of the natural or artificial teeth, as the case may be.

These illustrative examples should serve to clearly discriminate the two words and clarify the current confusion regarding their related yet distinct significations.—W. Storer How, D.D.S., Philadelphia, Pa.

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# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

**Ambler** (H. L.) Tin foil and its combinations, for filling teeth. Phila., 1897, S. S. White Dental Manufacturing Co. London, Claudius Ash & Sons, Limited.

**Marshall** (John Sayre.) A manual of the injuries and surgical diseases of the face, mouth, and jaws. Phila., 1897, S. S. White Dental Manufacturing Co.

**Nash** (Henry S.) Loosening teeth, or chronic alveolitis (Pyorrhœa Alveolaris, Phagedenic Pericementitis, Riggs' disease, etc.); its causes, clinical history, and treatment; with general remarks for the care of the teeth. 2 vols. Vol. 1, New York, 1897, Barton F. Welles.

**Smidt** (Henry.) [1875 ——.] Beitrag zur operativen Behandlung der Kiefercysten. Bonn, 1897, A. Henry, 43 p. 8°.*

**Tomes** (John) *Sir.* A system of dental surgery. Revised and enlarged by Charles S. Tomes. 4 ed. Phila., 1897, P. Blakiston, Son & Co. 727 p. 8°.

---

**Allard**. Du traitement des sinusites maxillaires par les instillations. Rev. internat. de rhinol., otol. et laryngol., Par., 1897, vii, 434–436.—**Amoedo** (O.) The rôle of the dentists in the identification of the victims of the catastrophe of the "Bazar de la Charité," Paris, 4th of May, 1897. Dental Cosmos, Phila., 1897, xxxix, 905–912.—**André**. Des kystes dermoïdes du plancher de la bouche. Rev. méd. de l'est, Nancy, 1897, xxix, 619–630.—**d'Argent**. Action de l'acide arsénieux sur la pulpe dentaire. Odontologie, Par., 1897, 2. s., v, 244–248. ——— De l'érosin. *Ibid:* 283–290.—**Armstrong** (F.) State of dental education in New Zealand. Brit. J. Dent. Sc., Lond., 1897, xl, 913–915.—**Arrington** (B. F.) Combination fillings and cohesive tin. Amer. Dental Weekly, Atlanta, Ga., 1897, i, 113. ——— Examining boards—an open letter. Internat. Dent. J., Phila., 1897, xviii, 729–734.—**Audry** (C.) **et Iversenc**. Epithélioma développé sur un lupus de la muqueuse bucco-pharyngée. Arch. méd. de Toulouse, 1897, iii, 295–297.—**Ball** (M. V.) The mouth is the via natura for the entrance of disease. Internat. Dent. J., Phila., 1897, xviii, 724–728 —**Barton** (W. M.) Chloroform vs. ether. Dental Brief, Phila., 1897–8, ii, 193–197.—**Beckmann** (H.) Zur Pathologie und Therapie der Rachenmandel. Monatschr. f. Ohrenh., Berl., 1897, xxxi, 389–401.—**Bergonié** (J.) Traitement électrique palliatif de la névralgie du trijumeau (tic douloureux de la face). Arch d'électric méd., Bordeaux, 1897, v, 377–398.—**Bickel** (O.) Pulp-capping with iodo-formagen cement. Items Interest, N. Y., 1897, xix, 826–828.—**Bönten**. Stampfen von Metallplatten direct auf dem Gypsmodell. Deutsche Monatschr. f. Zahnh., Leipz., 1897, xv, 435.—**Boettiger**. Die Therapie der Trigeminus-neuralgie. München. med. Wchnschr., 1897, xliv, 1150.—**Bourgogne** (D.) Un cas de lymphangite de la joue occasionné par la poussée tardive d'une dent de sagesse inférieure. Odontologie, Par., 1897, 2. s., v, 254.—**Broomell** (I. N.) Macroscopic tooth-development. Dental Cosmos, Phila., 1897, xxxix, 881–905.—**Brown** (G. V. I.) Hyperkinesis of the muscles of mastication a symptom and an etiological factor in nervous affections, particularly neuralgia of the trigeminus and diseases of the jaws. *Ibid:* 932–937.—**Bryant** (W. A.) The correction of cleft palate. Pacific Stomatol. Gaz., San Fran., 1897, v, 433–446.—**Butter**. Ueber die Aethernarcose. Jahresb. d. Gesellsch. f. Nat.-u. Heilk. in Dresd., 1896–7, 86–92. —**Carpenter** (G. T.) Reproduction of gum tissue. Dental Rev., Chicago, 1897, xi, 813–817. ——— Anterior pillars of the fauces, their abnormality, etiology, and treatment. Dental Cosmos, Phila., 1897, xxxix, 918. ——— Case of hare-lip and operations for same. *Ibid:* 937–942.—**Cas** (Un) de syphilide papulo érosive rare du voile du palais; monocordite. Gaz. méd. de Picardie, Amiens, 1897, xv, 254–256.—**Cassidy** (J. S.) Relations of chemistry to dentistry. Internat. Dent. J., Phila., 1897, xviii, 719–724.—**Castrillo** (J. M.) Estafilorrafia ó sutura de la úvula. Correo Internac. Odont., Madrid, 1896–7, ii, 636–639.—**Cattell** (D. M.) The etiology of dental caries. Dental Rev., Chicago, 1897, xi, 830–834.—**Cayre** (J.) Cancer ulcéreux de l'amygdale droite, de la base de la langue et du voile du palais; ablation de la tumeur par la cavité buccale; guérison. J. d. sc. méd. de Lille, 1897, ii, 382–384. ——— Papillome épithéliomateux de la base de la langue, extirpation; guérison. Echo méd., Toulouse, 1897, 2. s., xi, 511.—**Choquet** (T.) A few considerations on the leptothrix buccalis. J. Brit. Dent. Ass., Lond., 1897, xviii, 638–644.—**Coates** (A.N.) Method of crowning. Ohio Dent. J., Toledo, 1897, xvii, 509.—**Colley** (F.) Ueber Zungenverletzungen in gerichtlich-medicinischer Beziehung. Vrtljschr. f. gerichtl. med., Berl., 1897, 3. F., xiv, Supplhft., 107–116.—**Common** (R. K.) Notes on a case of eruption of central incisor in the nasal cavity, following operation for cleft palate. J. Brit. Dent. Ass., Lond., 1897, xviii, 656.—**de Croes.** Réinfections du sinus maxillaire pendant ou après le traitement de l'empyème. Odontologie, Par., 1897, 2.s, v, 248–254.—**Curtis** (G. L.) Tumors resulting from septic pulp of teeth. Dominion Dent. J., Toronto, 1897, ix, 355–358.—**Dennis** (G. J.) Report of a case of carcinoma of the buccal mucous membrane with microscopic exhibit. Dental Rev., Chicago, 1897, xi, 834–836.—**Didsbury** (G.) Hypertrophie chronique de l'amygdale linguale; revue de clinique et de physiologie pathologique. Arch. internat. de laryngol. [etc.], Par., 1897, x, 538–554.—**Dop** (G.) Considérations sur le traitement des abcès dentaires. Arch. méd. de Toulouse, 1897, iii, 212–221.—**Drew** (F. F.) A simple regulating appliance. Items Interest, N. Y., 1897, xix, 854.—**Druon** (E.) Pseudo-ostéome spongieux du maxillaire inférieur; ostéosarcome avec cellules à myeloplaxes. Echo méd., Toulouse, 1897, 2. s., xi, 490–492.—**Dunham** (T.) The operation for hare-lip. Post-Graduate, N. Y., 1897, xii, 603–608.—**Elliott** (W. S.) [—— 1897.] (Obituary.) Dental Cosmos, Phila., 1897, xxxix, 977.—**Ferguson** (F.) Screw worms in the antrum. Bi-Month. Bull. Univ. Coll. Med., Richmond, 1897, ii, 209.—**Fletcher** (F. F.) The practical bridge of to-day and the next step to improve it. Dental Digest, Chicago, 1897, iii, 607–611.—**Fournier.** De l'hydroa buccal. Rev. internat. de méd. et de chir., Par., 1897, viii, 329.—**Fox** (C.) British teeth on the down grade. Brit. J. Dent. Sc., Lond., 1897, xl, 915–919.—**Gaudier** (H.) Un cas d'empyème du sinus maxillaire de nature tuberculeuse; intervention par la fosse canine; guerison. Rev. hebd. de laryngol. [etc.], Par., 1897, xvii, 1297–1303.—**Gerhardi.** Ein Fall von Makroglossie. München. med. Wchnschr., 1897, xliv, 1233.—**Girard.** Resection totale du maxillaire supérieur sans ouverture de la cavité buccale. Progrès méd., Par., 1897, 3. s., vi, 265.—**Goard** (T. A.) A case of suppurating dentigerous cyst. J. Brit. Dent. Ass., Lond., 1897, xviii, 644–647.—**Goure.** Voûte palatine en ogive; déviations dentaires et végétations adénoïdes. J. de clin. et de thérap. inf., Par., 1897, v, 848.—**Grevers** (J. E.) Notes on various forms of the articulation of the lower and upper teeth. Brit. J. Dent. Sc., Lond., 1897, xl, 865–872.—**Gross** (G.) Chancre amygdalien. Rev. méd. de l'est, Nancy, 1897, xxix, 594–601.—**Gutiérrez** (G.) Un nuevo anestésico local. Rev. Dental Americana, Phila., 1897, v, 170–172.—**Hall** (G.) Artificial substitutes in resected maxillæ. Items Interest, N. Y., 1897, xix, 871–875.—**Hamburger** (A.) Ein Fall von Emphysem nach einer Zahnextraction. Deutsche Monatschr. f. Zahnh., Leipz., 1897, xv, 421.—**Harper** (J. G.) Fusible alloys. Dental Digest, Chicago, 1897, iii, 613.—**Haskell** (L. P.) Tinkering with continuous gum. Ohio Dent. J., Toledo, 1897, xvii, 505–507.—**Head** (J. T.) The natural principles underlying the construction of crown and bridge work. Items Interest, N. Y., 1897, xix, 831–834.—**Heldenbergh** (C.) Un cas d' hémiparésie partielle gauche de la langue d'origine hystérique. Belgique méd., Gand-Haarlem, 1897, ii, 481–489.—**Hirschsprung** (H.) Parotitis epidemica polymorpha; Hjernetilfælde. Hosp.-Tid., Kjobenh., 1897, 4. R., v, 817–829.—**Hotz** (F. C.) Holocain vs. cocaine. J. Am. M. Ass., Chicago, 1897, xxix, 1012.—**Hugues** (P.) Des abcès chroniques des amygdales. Rev. hebd. de laryngol. [etc.], Par., 1897, xvii, 1303–1310.—**Jarvis** (Alice.) A few points on taking impressions of mouth and making dentures before teeth are extracted. Items Interest, N.Y., 1897, xix, 830.—**Jousset** (A.) Emploi du chlorhydrate d'eucaïne en rhinologie, otologie et laryngologie. Nord méd., Lille, 1897, iii, 221–224.—**Klebba und Goltz.** Zur Frage der Immunisirung bei Maul- und Klauenseuche. Deutsche med. Wchnschr., Leipz. u. Berl., 1897, xxiii, 711.—**Krause** (F.) Die chirurgische Behandlung der Trigeminusneuralgie. München. med. Wchnschr., 1897, xliv, 1150.—**Krecke.** Zur Schleich'schen Infiltrations-anaesthesie. *Ibid:* 1165–1167.—**Launay** (P.) Kyste congénital sous-hyoidien. Bull. Soc. anat. de Par., 1897, lxxii, 608.—**Lauterbach** (M.) Zur Aetiologie der Facialisparalysie. Wien. med. Presse, 1897, xxxviii, 1289–1291.—**Lemière** (G.) **et E. Verstraete.** Etude bactériologique du pus d'un abcès rétropharyngien, pathogénie de ces abcès. J. d. sc. méd. de Lille, 1897, ii, 361–375.—**Lipschitz** Regulirung eines oberen Schneidezahnes auf operativem Wege. Deutsche Monatschr. f. Zahnh., Leipz., 1897, xv, 439–444.—**Lodge** (E. B.) The matrix. Items Interest, N. Y., 1897, xix, 824.—**Löwenbach** (G.) Beitrag zur Kenntniss der Geschwülste der Submaxillar-Speicheldrüse. Arch. f. path. Anat. [etc.], Berl., 1897, cl, 73–111, 1 pl.—**Mahé** (G.) De l'appareil de Kingsley pour le traitement de la fracture du maxillaire inférieur. Rev. de chir., Par., 1897, xvii, 781–796.—**Maréchal.** Blessure de la branche moyenne du tréjumeau par un balle de revolver. Presse méd. belge, Brux., 1897, xlix, 345.—**Martin** (G.) Contribution à l'étude du chancre de l'amygdale. Arch. méd. d'Angers, 1897, i, 540–542. —**Martin** (W.) Hypertrophy of the lingual tonsil. Med. & Surg. Reporter, Phila., 1897, lxxvii, 610.—**Mauclaire et A. Durrieux.** Tumeur mixte du voile du palais. Bull. Soc. anat. de Par., 1897, lxxii, 609–612.—**Meyer** (J. M.) Neurectomy of the superior maxillary division of the trifacial. Items Interest, N. Y., 1897, xix, 817–821.—**Mills** (W. A.) Actinomycosis in man. Dental Cosmos, Phila., 1897, xxxix, 949–955.—**Moty.** Pathogénie de l'évolution vicieuse des dents de sagesse. Odontologie, Par., 1897, 2. s., iv, 255–257.—**Nash** (C. A.) Crede silver salts. Items Interest, N. Y., 1897, xix, 825.—**Noble.** Correction of irregular teeth. Dental Cosmos, Phila., 1897, xxxix, 955–957.—**Nyman** (J. E.) The bleaching of discolored teeth. Dental Rev., Chicago, 1897, xi, 824–830.—**Oehme** (F. G.) On the use of chloroform. Med. World, Phila., 1897, xv, 458–462.—**Pallett** (W. H.) Persistent abscess after extraction. Items Interest, N. Y., 1897, xix, 869.—**Payne** (C.) Painless dentistry. Pacific Stomatol. Gaz., San Fran., 1897, v, 446–451.—**Perry** (E. J.) The possibilities of prosthetic dentistry. Dental Rev., Chicago, 1897, xi, 819–824.—**Pick**(M.) **und P. Knoll.** Ueber die Erscheinungen bei Wiederbelebung der durch Erstickung oder Chloroformzufuhr vernichteten Athmung. Arch. f. exper. Path. u. Pharmakol., Leipz., 1897, xl, 81–97, 3 pl. —**Porter** (F. C.) The relation of dentistry to general practice. Dental Rec., Lond., 1897, xvii, 441–451.—**Power** (D'A.) Empyema of the antrum in an infant. Lancet, Lond., 1897, ii, 1190.—**Price** (W. A.) Phenomena of cataphoresis. Dental Reg., Cincin., 1897, li, 525–538.—**Raugé** (P.) Paralysie traumatique du voile du palais. Arch. internat. de laryngol. [etc.], Par., 1897, x, 583–594. —**Rechold** (H.) *jr.* Zur Schleich'schen Infiltrations-anaesthesie. München. med. Wchnschr., 1897, xliv, 1167–1171.—**Rénon.** Recherches du plomb dans les glandes salivaires, au cours de l'intoxication saturnine aiguë expérimentale. Compt. rend. Soc. de biol., Par., 1897, 10. s., iv, 862.—**Réthi** (L.) Die Stimmbandspannung experimentell geprüft. Wien. klin. Wchnschr., 1897, x, 920.—**Roughton** (E. W.) Oral surgery—diseases of the glands. Brit. J. Dent. Sc., Lond., 1897, xl, 880–883.—**Rupprecht.** Fall von Dauererfolg durch operative Behandlung einer Trigeminusneuralgie. Jahresb. d. Gesellsch. f. Nat.-u. Heilk. in Dresd., 1896–7, 33.—**Sapièjko** (K. M.) Nouveau procédé d'uranoplastie après resection du maxillaire supérieur atteint de tumeur maligne. Rev. de chir., Par., 1897, xvii, 813–818.—**Shah** (T. M.) Tumour of lower jaw; removal of right lower jaw. Indian Lancet, Calcutta, 1897, x, 276.—**Simms** (W.) The extraction of fractured and difficult roots. Brit. J. Dent. Sc., Lond., 1897, xl, 878–880.—**Stowell** (S. S.) Hydronaphthol; with suggestions for its use in the treatment of the dental pulp, alive or dead. Dental Cosmos, Phila., 1897, xxxix, 912–918.—**Stutzer** (A.) **und R. Hartleb.** Das Bacterium der Maul- und Klauenseuche. Arch. f. Hyg., München. u Leipz., 1897, xxx, 372–404.—**Sutton** (J. B.) A chondroma of the submaxillary gland. Practitioner, Lond., 1897, lix, 459–461.—**Thompson** (J. E.) Tumors of the upper jaw and naso-pharynx. Univ. Med., Galveston, 1897–8, iii, 4–16.—**Tomes** (C. S.) Notes upon some forms of enamel. J. Brit. Dent. Ass., Lond., 1897, xviii, 650–652.—**Van Woert** (F. T.) The milliampere-meter in cataphoresis. Items Interest, N. Y., 1897, xix, 821–824.—**Verebély** (L.) Dermoid tömläk a szajüregben. [Dermoid cysts in the cavity of the mouth.] Gyógyászat, Budapest, 1897, xxxvii, 640–642.—**Vidal** (A. T.) Estomatitis. Correo Internac. Odont., Madrid, 1896–7, ii, 633–635.—**Wallace** (R. D.) Alveolar abscess, resulting from a broken nerve broach. Ohio Dent. J., Toledo, 1897, xvii, 507–509.—**Whittles** (D.) Some factors which cause eruption of the teeth. J. Brit. Dent. Ass., Lond., 1897, xviii, 629–637.—**Wood** (F. C.) Case of acute necrosis of alveolar process of superior maxilla in a baby two days after birth. Brit. M. J., Lond., 1897, ii, 1259.

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# LIST OF UNITED STATES PATENTS

## PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING NOVEMBER, 1897.

*November 2.*—No. 592,878, to F. L. MORHARD. Dental electrode.
" *23.*—No. 594,117, to M. C. MERKER. Cuspidor.
" *30.*—No. 594,486, to J. E. NICHOLS. Dental appliance.

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# ORIGINAL COMMUNICATIONS.

## SCIENTIFIC CRITICISM AND THE NEW YORK INSTITUTE OF STOMATOLOGY.

BY J. LEON WILLIAMS, D.D.S., L.D.S., LONDON, ENG.

THE avowed object, if I am not mistaken, in the formation of the above-mentioned society, was to secure an organization of dentists who were progressive and who desired to free themselves from what they were pleased to speak of as the "political wire-pulling" and favoritism alleged to be abuses in the older dental societies of the cosmopolitan city of New York. This condition, they intimated, acted as a great hindrance to the free and unfettered scientific discussion of questions of deep interest to dentists. The professed object was a laudable one; but, alas! it is so difficult for human nature to get away from itself.

On October 5, 1897, the New York Institute of Stomatology assembled to hold what Dr. James Truman understood to be "a sort of symposium on Drs. Black and Williams," but which, if one may accept the opinion of the president of the society in his summing up of the efforts of the evening, turned out to be somewhat in the nature of a very different sort of celebration. "There is," says the president, in his concluding remarks, "a most astonishing unanimity of opinion in the various papers we have listened to this evening concerning the conclusions of Drs. Black and Williams." (Astonishing indeed!) "It would appear that the profession does not accept them as correct. It is a little surprising that no one writer or speaker has approved of them." There are several curious things about this statement. One is the magnificent assumption that the New York Institute of Stomatology represents the dental profession. For, mark you, it is the dental *profession,* he says, after having listened to the most marvelously contradictory opinions of half a dozen gentlemen, which rejects the conclusions of Drs. Black and Williams. This, of course, is simply not true. Another curious thing is that the statement is not true if applied only to the society over which he presides. And still another curious thing is that it is not true if applied only to the gentlemen who took part in the discussion. Why this manifest anxiety, dear Mr. President, to place the seal of condemnation of an entire profession upon the work of your humble servants because two or three gentlemen, who obviously not only do not know much about the subject, but do not even know what they themselves think about it, have expressed dissenting opinions? But when I turn to the published statements from which this opinion of the president was drawn, I am not so disheartened. The list is headed by a short paper from Mr. Charles S. Tomes, which is a perfect model of what scientific criticism should be. Clear, concise, definite, and restrained, it contains more substance than volumes of mere opinions clutched at in the air.

Broadly speaking, Mr. Tomes indorses the more important of Dr. Black's conclusions. In certain details he thinks more complete investigation is necessary before conclusions can be reached. Not a single word in this too brief paper gives the slightest warrant for the sweeping statement of the president. The closing paper of the symposium was read by Dr. B. Holly Smith, of Baltimore. If this is not a cordial indorsement of Dr. Black's work, both in its general statements and in the interpretation of the clinical cases cited, then I must have lost the faculty for reading and reasoning. The same thing may be said of a large part of the remarks made by Dr. Bogue and some others. Whatever their *intentions,* so far as they dealt with matters of fact their utterances were largely in support of the conclusions of Drs. Black and Williams. I am frank to confess, however, that if the members of a dental society in a certain city had, after the discussion of a paper which had been read before a representative gathering of dentists at another society in that same city, and in its general conclusions cordially indorsed; I say, if a rival society had as unanimously condemned the conclusions of such a paper, it would, as the president of the New York Institute of Stomatology says, have been truly astonishing. Such unanimity of opinion in agreement or disagreement is, in scientific matters, generally not confined to the members of particular societies, and it will be a discouraging day for scientific research if such a state of things ever prevails. With this by way of introduction, I will leave the discussion of the personal position of Dr. Black for him to deal with himself, which he will no doubt do in a thoroughly satisfactory manner, and I will discuss the papers under consideration only so far as they bear upon my own work and conclusions.

Dr. James Truman is the only one in the Stomatological coterie who has coupled my name in the title of his paper with that of Dr. Black, and it is to his paper that I will chiefly give my attention.

I often think how delightful it would be if we could separate the particular traits, qualities, or utterances of our friends which we wish to criticise, and take them aside privately for a little lecture, and so avoid hurting all the rest of the nature which we respect, admire, or love. But, unfortunately, this seems impossible in the nature of things. Most people appear to feel that they have been hurt or hit all over if some particular spot is touched. I am deterred from expressing all the admiration I feel for Dr. Truman and others who took part in this discussion through fear of being charged with taking unwarrantable personal liberties in public; but I may say that I live in the hope of seeing the faculties and qualities which they are now using so perversely stanchly employed in the support of the conclusions stated at the close of the paper which I read before the New York Odontological Society a year ago. In the mean time I have to point out several misrepresentations, false premises, and wrong conclusions which appear in Dr. Truman's recent utterances. And the very first thing which it is important for me to do is to deny the intimation of Dr. Truman that I have unqualifiedly indorsed all of Dr. Black's conclusions. Not possessing those peculiar qualities which were so much to the fore in the discussion in which Dr. Truman took part, of passing judgment offhand on work with which I am not familiar, I am unable to say whether I indorse all of Dr. Black's conclusions or not. Broadly speaking, my position is that of Mr. Tomes. So far as my own work is concerned, it is largely a confirmation of Dr. Black's conclusions in the field covered. On the main points it is emphatically so. On these points it is no longer a question of opinion, but of simple fact, and when the facts are all before one it is no longer possible to speak of tooth-structure as a cause or as a direct antecedent of dental caries. I have in several places been most careful to point out the danger of confusing a *modifying condition*, in this connection, with a cause. I have been most careful to point out in text and illustration that there is a great variation in enamel-structure, but that this variation has no direct relation to the *cause* of dental caries. When this cause—namely, acid-forming micro-organisms—is present and active, then it must be obvious to any one that the sort of variations in tooth-structure which the microscope reveals must of necessity exercise a modifying influence on the progress of decay. But a modifying influence is a totally different thing from a cause. Without the presence of the cause, the modifying condition, from a clinical standpoint, has no significance whatever. I imagine a very large part of the difficulty in the minds of those who took part in this discussion grew out of the mental confusion consequent upon interpreting cause and modifying condition as somehow convertible terms. The *extent* to which possible differences in structure not shown by the microscope modify the progress of decay is at present an entirely unknown quantity, and I, for one, find no amusement or edification in passing judgment upon unknown quantities or conditions. The known facts which seem to bear upon this point are very contradictory. Let it be clearly understood then, once and for all, that I do not deny that structural differences in teeth have a modifying influence on the progress of caries. I simply say that at present we do not know much about the point, and the facts relating to it appear to be contradictory. What we do know, and what must be constantly insisted upon until the hard stones of obstinacy and prejudice are worn away, is that *the softest teeth will not decay in a healthy mouth,* and that *the hardest teeth must be destroyed when attacked by acid-forming micro-organisms.* Consequently, say we, structure cannot properly be spoken of either as an active or as a predisposing *cause* of decay. If the logic of this position is not apparent to any one, his mental condition must be well-nigh hopeless. When, therefore, Dr. Truman persists in saying that decay of the teeth is primarily due to a degeneration which has taken place in the tissues of these organs, either in the individual or through successive generations,* or when he asserts that the profession is right in maintaining this view, I have to reply that he is opposing a dogmatic statement of error to the most clearly demonstrated truth.

For, if the evidence of a degeneration in human teeth is based upon a study of their microscopic structure, then I have to point out, as I did in my recent paper, that almost every form of tooth-structure which has been classed as pathological in human teeth is to be found in the teeth of wild animals, where caries is almost unknown. Dr. Truman says that he has examined my paper carefully. His statements before the Stomatological Institute hardly confirm this. In speaking of my comparisons of the structure of human and wild animal teeth, he says, "There seems to be a wide distinction to be made between the fissures upon the occlusal surfaces of molars and bicuspids in man and that of the porcupine. . . . It must be apparent to the most careless observer that the defects in the formation of the enamel in the human teeth hold no relation to the perfect enamel surface of those illustrated, and this may be said of all the depressions of the various forms of carnivora, rodentia, ungulata, ruminantia, etc." I wonder, I wonder how Dr. Truman could have made such a statement as that. Now let the reader turn to my paper and see what I say upon these points, and especially study Figs. 9, 10, 11, 12, 13, 15, 16, 17, 20, 26, 27, 28, 29, 36, where almost every form of imperfection (not only in the way of pits and fissures, but faults of structure in the substance of the enamel) that has been figured in human teeth as pathological may be clearly observed.

It is unnecessary for me to make either affirmation or denial as to the question of degeneracy of human or animal teeth. I simply point to the facts, and it is folly for Dr. Truman or any one else to kick against these facts. After a very careful reading of Dr. Truman's paper, it seems to me difficult to determine what his position really is on the main issues. His statements seem to me to be so contradictory that I hesitate to draw any final conclusions about his position. The only thing that appears evident is that, like the politics of the newly arrived Irishman who did not known whether he was a Republican or a Democrat, but he was "agin the government," whatever it might be, so he is "agin" Black and Williams, whatever their views. Take the following quotations from his paper as an illustration. He is speaking of my investigations on the structure of enamel of the teeth of animals, and he says that I have "proved that the difference in the destruction between man and the lower forms is placed principally upon environment." Very well. If I have proved this, what becomes of his attitude on the next page of his paper, where he defends the position that decay of the teeth is due primarily to degeneration which has taken place in the tissues of these organs? He quotes this statement from my paper, where I give it as the general opinion of the dental profession, and he says if I mean "degeneration through successive generations, then the profession holds to the correct view." There used to be a saying in New England that a Philadelphia lawyer could prove anything, but I opine that even a Philadelphia lawyer would not undertake to defend these two positions simultaneously. Again, in this same connection, Dr. Truman quotes my statement that if a dozen dentists are asked why human teeth are decaying so rapidly while the teeth of animals are not, a majority will reply that it is because the structure of human teeth is not so good as that found in the teeth of animals, and his comment upon this is, "This must be regarded as a pure creation of the imagination, as no one at all intelligent upon the subject would make such a statement." He then immediately proceeds to defend the profession for holding what is this very identical view.

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*Dr. Truman is entirely in the wrong in assuming that no one will attempt to maintain the theory of individual degeneration of teeth, as he can see for himself by carefully reading the opinions of some of his colleagues in the discussion under consideration.

For, if there *has* been degeneration in the structure of human teeth, then, obviously, the alleged inferiority of structure is due to this degeneration; and Dr. Truman says the profession is right in holding the view that decay is primarily due to degeneration which has taken place in the tissues of these organs. Once more, I say, he may maintain one or the other of these two positions, but he cannot possibly defend both. If, as he admits, I have proved that dental caries is primarily due to environment, then it cannot also be primarily due to defects of structure as the result of degeneration; and, also, if the profession is right in its opinion that decay is primarily due to defective tooth-structure growing out of degeneration, then my simple statement that this opinion is so held cannot possibly be "a pure creation of the imagination."

Another illustration of Dr. Truman's recklessness of statement is to be found in his assertion that I "repudiate the possibility of the degeneration of teeth," and in so doing "set aside facts as well established as the process of development of teeth." And pray, dear sir, where have I ever made any such statement? Nowhere. It is a pure creation of your imagination. What I *did* say upon this point was that the oft-repeated statement that decay of human teeth grew out of or was primarily dependent upon imperfections of structure as the result of degeneration was a pure gratuitous assumption, and I gave as my reason for saying that it was a pure gratuitous assumption the fact that no one had made a careful comparison of the teeth of men and animals as the only possible means of showing whether there had been a marked degeneration. But I admitted that there were occasional well-marked cases of degeneration, and I further stated what is absolutely true, that a whole system of dental pathology had been built up on the foundation of these occasional instances, which do not constitute one-tenth of one per cent. of decaying teeth. I am heartily weary of seeing mere assumptions and opinions put forward in opposition to demonstrated facts and then defended with all the fierce dogmatism which usually characterizes those who prefer opinions to facts. These opinions and assumptions hang about every profession and every art, hindering progress as the barnacles on a ship's bottom hinder *its* progress. If I could get the ear of every young man starting out on the voyage of life, I would shout four words with all my might, and these four words would be, *"Scrape off the barnacles!"*

In what Dr. Truman has to say about the presence of organic matter in enamel there does not appear to be much calling for special notice from me. He seems to give and to criticise some definitions of the term "organic," as though quoted from me. If this is what he really means, he is mistaken, as I did not use those expressions in the paper under discussion, and I have no recollection of ever having used them. From this part of Dr. Truman's paper it appears that I am to be criticised for taking up a certain position, based upon an overwhelming mass of facts, with reference to the presence of organic matter in enamel, and that I am to be further criticised because I gave frankly, out of the results of my own work, a few facts which, considered alone by themselves, might appear to be against my main contention. Because I have, during more than twenty years' study, found *two specimens* of human enamel in which some trace of organic matter remained after decalcification, these lone instances are seized upon as being big with possibilities undreamed of by me. Have I not said as plainly and as clearly as I know how to say it that enamel *is* built up on an organic substructure, and that this organic substructure is simply the cytoplasm of the enamel-forming cell, or ameloblast, which, except in rare instances, *becomes completely calcified?* I believe I am correct in quoting Professor Sudduth as saying that he has never been able to discover the slightest trace of organic matter in enamel after decalcification. Is there not to be clearly seen in this method of criticism a complete justification of my contention that there is a strong tendency to place speculation in the position that investigation should occupy, and to build up theories upon the most flimsy foundation?

Dr. Truman then takes up what I consider by far the most important point in this discussion,—viz, the action of micro-organisms on enamel. When I say, with all due caution as it appears to me, that "*the appearances indicate* that decay is the result of some specific cause acting continuously at some particular point in a manner impossible to free acids in the mouth," Dr. Truman remarks of me, "He assumes a proposition that he does not prove." Here, again, we have an instance of an attempt to exaggerate the force of my statement so that his own argument may appear stronger. He therefore assumes that I have claimed to *prove* a certain position, when there before him is the plain statement that "appearances indicate" what I have suggested.

No, my dear sir, I have *not* seen any particular micro-organism excrete an infinitesimal quantity of acid, nor have I ever seen an infinitesimal quantity of acid unite with an infinitesimal quantity of tooth-substance, and I have, therefore, made no attempt to *prove* by any other than circumstantial evidence that decay of enamel occurs in this manner. Dr. Truman adds that "the mere fact that destruction is shown to have taken place beneath the fungi depicted has no force." Indeed! has it not? We shall see. The force of a fact bearing upon an unfamiliar subject is often much more clearly seen if an analogy or parallel is drawn. I will endeavor to draw such an analogy as fairly and as truly as I can. Dr. Truman is returning to his country home one autumn evening somewhat later than usual, and as he passes up the garden walk leading to his door he hears a peculiar noise, and, looking up, he discovers a man hastily scrambling down from his favorite fruit tree. Curiosity seems to prompt him to follow the man a little way. I have just parted from Dr. Truman at his garden gate, and am passing along the street to my own residence, when I hear the sound of rapid footfalls, and a man, carrying a large basket, hurriedly jumps over the fence and almost into my arms. The appearances are so suspicious that I seize the man and hold him until Dr. Truman comes up, when we find that the man's basket is full of apples which are apparently identical with those which were growing on the tree in Dr. Truman's garden. An examination of the tree shows that the apples are all gone. "Well," say I to Dr. Truman, "what are we going to do with this chap?" "Oh, nothing, nothing," he replies; "let him go." "But are you not going to take him before the police court and bring a charge of theft against him?" I ask, in astonishment. "No," says Dr. Truman, "I have no proof that he has been stealing." Just then a policeman comes along and identifies the man as a notorious thief. But still Dr. Truman refuses to bring any charge against him. I mildly protest that *the appearances all indicate* that this fellow has stolen his apples. There *were* apples on the tree this morning. This man was seen in the tree. The apples are now gone from the tree, and his basket is filled with what *appear* to be the same apples. "That may all be true," Dr. Truman languidly responds; "but the mere fact that my apples are gone and that I saw this man in the tree, and that apples similar to mine are in his basket, *has no force*." Here, as I shall proceed to show, is every element of Dr. Truman's argument concerning the relation of bacteria to enamel-decay reduced to its grotesquely absurd and legitimate conclusion. But before tracing out all the steps of this analogy I must express an inclination to criticise Dr. Truman somewhat severely for the wholly unwarranted course he has taken in limiting the action of the micro-organisms concerned in the destruction of enamel to the leptothrix forms. How can I avoid the conclusion that he took this course, in defiance of the most obvious facts, because it was the only one open to him? And yet he must have known that the truth was open for any one to see who had sufficient interest in the matter to examine the photographs illustrating my paper, where a large number of forms of micro-organisms beside the leptothrix forms are shown. I give up the problem, and can only say that the working of some minds, when bent upon maintaining a certain fixed course, is full of contradiction and mystery.

I frankly confess that in the preparation of my paper on enamel-decay it never occurred to me that there would be any question about the acid-producing functions of the micro-organisms shown. I assumed a reasonable familiarity with the subject on the part of my hearers and readers. I assumed that they knew something of Miller's work, and it simply never occurred to me that it was necessary to go over this part of the subject in detail. I still think that I was right in assuming this. I still think that most of my hearers at the meeting of the Odontological Society when the paper was read, and that most of those who have read the paper as published, not even excepting a majority of the members of the New York Institute of Stomatology, do know that Dr. Miller demonstrated the power of many forms of mouth-bacteria to convert carbohydrates into lactic acid. Or, perhaps it would be more nearly scientifically correct to say that one result of the action of many forms of bacteria found in the mouth upon carbohydrates is the production of lactic acid. As I have already pointed out, Dr. Truman takes it upon himself to assume that none of these acid-producing forms are shown in my paper. If he were really familiar with Dr. Miller's work and had examined my illustrations more carefully before writing his paper, he would not now be in the very awkward position in which he must find himself. If he had been more familiar with Miller's work he would, before assuming that all the thread-like forms shown in my illustrations were leptothrix, have recollected the following significant statement from page 70 of Miller's "Micro-Organisms of the Human Mouth," which I will place in italics that it may not again be overlooked: *"We must guard against the very common error of considering every thread-forming organism which occurs in the oral cavity, or is obtained in pure culture from the juices of the mouth, as 'Leptothrix buccalis,' inasmuch as threads are formed by various micro-organisms."* And if Dr. Truman had examined my illustrations more carefully he would not have done so grossly careless a thing as to leave the impression with his readers that my illustrations show only leptothrix, or even thread-like forms of bacteria.

As a matter of fact, then, let me say that bacteria which have been identified as acid-producers *are* shown in my photographs, and may be found by any one on the surface of decaying enamel. And again: If Dr. Truman had carefully read and understood the significance of Dr. Choquet's recent paper, he probably would not have cited it with the intimation that it confirmed his own position. Dr. Choquet distinctly says that in two species of leptothrix which he succeeded in cultivating he did find them fermentation agents, and, in the case of the lactose experiment, "*very defined fermentation.*" Neither does he report Dr. Choquet correctly in saying in his foot-note that he "was not able to demonstrate their pathological character." What Dr. Choquet *does* say, as reported in the magazine over which Dr. Truman presides, is this: "I have not been able to ascertain the *degree* (italics mine) of pathogeny which the species possess," which is a very different thing from Dr. Truman's statement.

I am again sorely puzzled as to what sort of criticism I should pass upon the last two pages of Dr. Truman's paper. I have several times carefully read and pondered every sentence, and I have to confess that I cannot tell what he is driving at. I hesitate to accept a plain surface interpretation of what he says, for this would be to discredit his intelligence to a degree I am quite unprepared for. What, for instance, does he mean in saying that "Fermentation in the mouth cannot be set aside as a direct producer of destruction of the tissues of the teeth"? I do not know of any one who has attempted to set this aside except the gentlemen who are opposing the views of Dr. Miller, Dr. Black, myself, and others who agree with us. There is certainly a most striking instance of an attempt to set the idea aside in the long-drawn-out and lugubrious hodge-podge of nonsense which was contributed by one of the gentlemen who took part in the discussion before the New York Institute of Stomatology on October 5, 1897. But I can hardly believe that Dr. Truman was striking at one of his own colleagues in this discussion.

And again, after speaking of the so-called soft, chalky teeth, he says, "The acid action upon this character of tooth-structure is too rapid to indicate micro-organic co-operation. It is direct chemical action." And, pray, what is the chemical which produces this action? "Why," Dr. Truman would answer, "acid produced by fermentation, of course." And acid fermentation is produced by bacteria. I repeat, it seems in the nature of an insult to the intelligence of Dr. Truman to point out that no one in recent years has, so far as I am aware, made any other claim for the *rôle* of micro-organisms in the destruction of enamel than that it is by the action of the acid which they produce by processes of fermentation, which is, as he truly says, a purely chemical action.

This is the gist of all of Dr. Miller's work and Dr. Black's work, and it was the chief point aimed at in my own recent paper. What, then, were Dr. Truman and his colleagues of the New York Institute of Stomatology trying to do in their discussion? I give it up. But I know what the *effect* of that discussion will be. It will obfuscate and befog the minds of many who were beginning to see clearly the solution of this long-standing problem of dental caries.

Here is the whole substance of the matter on this point in a few words: Dr. Miller showed by different series of experiments that there were at least sixteen forms of acid-producing bacteria to be found in the human mouth. Several of these forms are to be constantly found mingled with and lying beneath the felt-like mass of micro-organisms which, so far as observation goes, always covers the places where decay of enamel is taking place. We know that enamel is destroyed in a certain manner (shown in my photographs) by the action of acids. We know that acid-forming bacteria are attached to the places where enamel is decaying, and we see that the appearances of the decaying enamel are precisely the same as are produced by the application of these same acids artificially. I submit that the evidence on all points is as strong as that against the hypothetical thief in Dr. Truman's apple-tree. I have suggested, what must be in the nature of a self-evident fact to any ordinary mind, that an acid produced beneath a thick, felt-like mass of micro-organisms, where it is not likely to be much diluted and where it is free to exert a full, undisturbed action upon the enamel, must be, in the nature of things, more effective in destroying the tissue than the same acid would be if produced by bacteria floating about in the mouth. I have not the least objection to the idea that some small part of this free acid may find its way beneath the thick, felt-like mass of bacteria, and so, in some very small way, assist in the destruction. Dr. Truman probably could not have thought of an illustration more antagonistic to his own position than that of the pledget of cotton in a cavity of decay; for such a pledget of cotton would act as a nest, a breeding-place, so to say, for the bacteria, and at the same time as an anchorage for holding the materials on which the micro-organisms act in the production of acids.

The position which I took up in my paper was in every way cautious and conservative, and was based upon facts which are left entirely untouched by anything that Dr. Truman or his colleagues have said. That position is, briefly, this: There is an overwhelming mass of facts going to show that decay of enamel is the result of the action of acids produced by micro-organisms. Up to the present time not a single fact has been produced against this view. When all of the facts are considered, it is extremely improbable that free acids in the mouth play any or, at the most, more than a very unimportant part in the destruction of enamel. Tooth-structure cannot be spoken of as a *cause* of decay by any one who wishes to use language in a correct and scientific manner.

Tooth-structure modifies the progress of decay just to the extent that imperfections of structure give greater opportunity for the action of acid, or otherwise. Whether or not there is any condition of the tooth-substance beyond the power of the microscope to discover which may modify the progress of caries is at present, as I have already said, a purely speculative question. It may or it may not be so. If the condition of my health permits, I hope soon to present an article on the long-discussed subject of "hard" and "soft" teeth, as revealed by the microscope, in which it will be seen that there is some foundation for a clinical experience the facts of which have been greatly, although, perhaps, naturally, misinterpreted.

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# HUMAN TEETH FROM A COMPARATIVE STANDPOINT.

BY CHARLES H. WARD, ANATOMIST,

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(Read before the American Dental Association, August 4, 1897.)

MR. PRESIDENT AND GENTLEMEN:

The collection illustrating Comparative Odontology which I have the honor of exhibiting to the members of the American Dental Association, requires a body of specialists for its intelligent appreciation. Not alone is man represented by a wealth of material commensurate with the practical importance of the subject, but the entire range of the vertebrate sub-kingdom, both living and extinct, has been ransacked for types and specialized examples of dentition; while most of the higher groups of invertebrates, as well, have contributed their primitive masticatory organs.

### *Distribution of Teeth.*

As a prelude to the more strictly human limits of my title, permit me to briefly outline that vast domain from whose farthest limits, we are told, our race has emerged through an exodus beside which that of the Israelites was but the footstep of an idle moment.

Teeth are by no means universal in the organic world, the entire vegetable kingdom, and many true animals as well, being devoid of them. The causes of this edentulous condition in forms whose existence depends upon the ingestion of food are various. Plants, with few exceptions, feed upon soluble, inorganic elements, that require merely to be absorbed,—by roots from the moist ground, by leaves from the surrounding air. There is no mouth, and therefore no teeth, in the plant.

Let us then turn to the animate world.

### *Ancient Marine Life.*

Before the land was ready for the invasion of animal life, the shallow, wide-reaching oceans swarmed with living organisms. The tiny protozoans, first voyagers of those primeval seas, have left a monument of their numerical greatness in the chalk-cliffs of England, a monument composed of the remains of Foraminifera, so minute that a cubic inch of the chalk has been estimated to contain more than a million. Yet their fragile shells built up deposits, measuring in places a thousand feet in height, and extending from the north of Ireland to the Crimea. Beside this gigantic tomb the pyramids are but grains of sand; yet the pyramids themselves are built of Nummulitic limestone, a formation of great thickness, in some places *nearly two miles,* that stretches from France to China. The Nummulites (from which the rock derives its name), escaping from their matrix, have strewn the bases of the pyramids (and the plinth of Cleopatra's Needle, in Central Park, as well) with little round fossils, which Herodotus naïvely described as *fossil beans*, remains of the prehistoric meals of their forgotten builders. Now, these hundreds of leagues of strata contain, almost exclusively, not beans, but *Foraminifera.* As tending to modify our ofttimes too specialized conception of the parts necessary to an animal, it may be well to note that, of all that vanished host of amœboid organisms which "lived, and moved, and had their being" in those far-off geological epochs, not one possessed that apparently essential organ, a mouth!

### *Food of Protozoa.*

The lot of the marine protozoan is, from the human standpoint, easy. Living in a fluid medium, its food is brought within its grasp in an already comminuted and macerated condition, the craggy coastline against which the troubled waters dash playing the part of teeth for myriads of fragile forms. And water, our universal solvent, by its softening and disintegrating processes, furthers this dissolution, producing in a simpler way the same result as do the most complex of digestive apparatuses,—namely, a solution.

### *Habits of Sponges and Cœlenterata.*

Turning from these simple unicellular forms to the more complex Metazoa, we find the Sponges and Cœlenterata subsisting on water-borne rations, wafted into their body-cavities by scores of eager, waving arms. Living as they do in a sort of diluted broth, but little exertion is required to obtain food, and, accordingly, whole communities of these lowly animals actually take root, in the comforting assurance that "all things come to him who waits." The progeny of these rooted forms are commonly born free swimmers; as for example, the young Sponge or Hydroid; but after a brief "grand tour" the former settles down, after the manner of his ancestors, while the latter, disdaining so tame an existence, yet begets offspring who, strangely enough, inherit their grandparents' form and habits with astonishing regularity.

### *Genesis of Locomotion.*

The necessity of a proteid diet, however,—*i.e.*, of a food-supply consisting of the bodies of other organic beings, animal or vegetable,—eventually forced many animals into motion. Hunger was undoubtedly the genesis of locomotion, which latter is the price we pay for a proteid, and therefore scattered, diet. And all the myriad devices whereby the animal creeps or swims or flies,—the sperm-whale sweeping with pendulous mandible the floor of shallow oceans, the albatross poised on tireless pinions far above the rolling waves, the gorilla swinging lazily from branch to branch of tropic forests, the serpent gliding stealthily through the tremulous grasses,—all these diverse methods of transportation are the effect of food-supply. All higher animals possess this essentially ennobling attribute of voluntary motion, and it may be accepted as a truism that whenever a form, be it worm, fish, or man, attaches itself permanently to the food-supply as a parasite, that form degenerates.

### *Teeth Defined.*

The propriety of including the varied masticatory mechanisms of invertebrates in an odontological collection can hardly be questioned. If by *teeth* we understand "certain hard bodies, situated in the mouth or at the beginning of the alimentary canal," as defined by Lucas,* then the buccal armament of the higher invertebrates falls within this category, although in none of these animals are they strictly homologous with the teeth of vertebrates.

### *Evolution of the Brain.*

It is in that heterogeneous group of animals known collectively as Worms that these tooth-like organs first appear. Several accompanying details of structure deserve passing mention. The fact that worms were the first multicellular animals to move habitually in one direction explains, as pointed out by Thomson, not only the development of a head, but, since the head-end must ever be the first to receive impressions of external objects, sensory organs and nerve-ganglia became more developed in this region.

An increase of this *cephalization* eventually produced the brain of higher types. As the olfactory organs, probably first developed as primitive food-inspectors, sharing in this centralization of the sensory apparatus, became located in the front rank of the great *nerve-sentinels*, it followed as a natural sequence that a mouth should be located in their immediate vicinity rather than elsewhere. Thus is explained the apparent anomaly of the existence, side by side, of the most material and the most ethereal of the bodily functions. Nereis, a common chætopod worm, has a pair of laterally opening jaws, each armed with a single sharp, horny hook, which, in the specimen exhibited, was dissected out.

### *Earliest Calcified Teeth.*

The earliest appearance of calcified teeth is in a group of Echinoderms, popularly known as sea-urchins. Here we meet with that complicated apparatus, the "Aristotle's lantern." It consists essentially of five jaws, each armed with a single socketed tooth, and is moved by an elaborate muscular system. This guards the oral aperture and serves to comminute morsels too large to be swallowed whole. The jaws close somewhat after the manner of a drill-chuck, all the teeth moving concentrically; beside this, the whole apparatus may be protracted or retracted at will.

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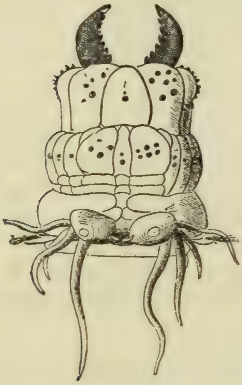
*Johnson's Encyclopedia, 1897, article "Teeth."

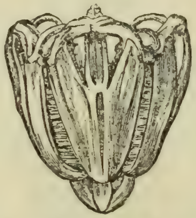
The habitual posture of the typical sea-urchin, mouth downward and anus uppermost, will doubtless strike the student of vertebrate morphology as anomalous.

FIG. 1.



Head and Jaws of *Nereis virens*.

FIG. 2.



Aristotle's Lantern of *Diadema setosum*.

## *Alimentary Organs of Arthropoda.*

Among the Arthropoda (invertebrates with jointed appendages) the Crustacea offer interesting peculiarities of structure. In the crayfish or lobster, for example, mastication is accomplished in part by the hard, laterally moving mandibles, assisted by numerous modified feet; to be completed by the "gastric mill," located in the cardiac region of the stomach. During the annual moult, not only the external carapace, now grown too small, but the entire stomach-lining, ossicles and all, is cast off.

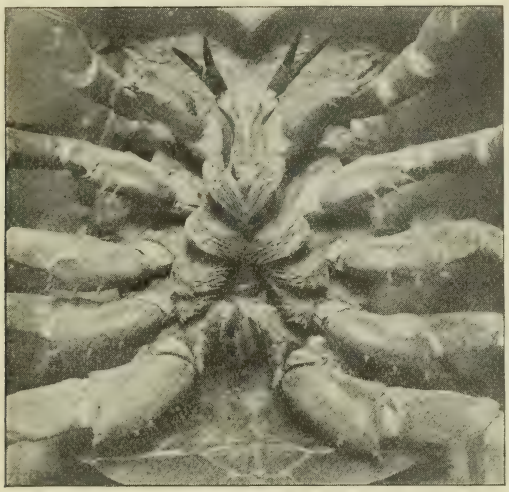
Obviously, there can be no edentulous senility in a creature yearly endowed with a complete new denture.

The specimen presented is the gastric mill of a lobster *(Homarus Americanus)*, who may haply yet contribute many duplicates to science ere his "salad-days" arrive.

Of the Myriapoda, those many-legged, worm-like forms, the poisonous Centipedes are armed with toothed, cutting mandibles, beside their two poison-claws. The similar, but harmless, Millipedes have mandibles modified for mastication. In no class do we find a greater variety of feeding-organs than in that of Insects. All, however, may be included within the masticatory and suctorial types, the one supplied with biting or cutting mandibles, the other frequently bearing, in addition to mandibles of reduced size, some form of lance-like appendage, together with a flexible, tubular proboscis, as in the common house-fly. The dragon-fly, or Devil's darning-needle of our boyhood, has the well-developed mandibles of the masticatory type. Surely, if any insect deserves well of mankind, it is this burnished knight, whose favorite food is *mosquitoes*.

In those insects which include a complete metamorphosis in their life-history the larval form is characterized by masticatory organs of exceptional size and vigor, which may be much reduced, or even entirely modified in character, in the imago. Thus, the larval butterfly, who has been observed to eat many times his own weight of vegetable food in a single day, has cutting jaws of adequate proportions, while the adult is suctorial in habit. Indeed, among many insects, as the May-fly, or the butterfly of the silkworm, the adult has undergone an atrophy of the digestive tube, contemporaneously with development of the reproductive organs. Having wholly ceased to feed, their subsequently brief maturity is devoted to love; to the generation of progeny upon which their parental eyes can never rest.

FIG. 3.



Ventral Surface of *Limulus polyphemus*, showing mouth-parts.

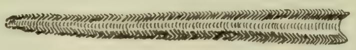
Of the Arachnoidea, all scorpions and spiders are suctorial feeders, although in both the prey is grasped by *falces*,—*i.e.*, jointed mouth-parts,—which in spiders contain poison-glands. In mites and ticks the mouth-parts may be modified either for biting and comminuting, or for piercing and sucking. Finally, that solitary survivor of a most ancient family of arachnoids, the king-crab (*Limulus polyphemus*), which is not a crab at all, wears his mouth between his five pairs of legs, the bases of which are toothed and assist in prehension and mastication.

### *Teeth of Mollusca.*

Of the three principal classes of Mollusca, two exhibit considerable variety of dentition, while the Lamellibranches, or bivalves, at once the lowliest and the least motile of the group, are devoid of hard mouth-parts. These headless forms ingest microscopic plants and animals and organic *débris*, which are swept into the mouth by the lashing cilia or throbbing gills. They are seemingly devoid of any power of selection, ingesting indifferently such nutritious or innutritious particles as may come their way. The ciliated epithelium of the human palate and pharynx, in common with the branchial clefts of the embryo, are undoubtedly souvenirs of an earlier marine ancestor, from whom we, in common with all the terrestrial vertebrata, have sprung.

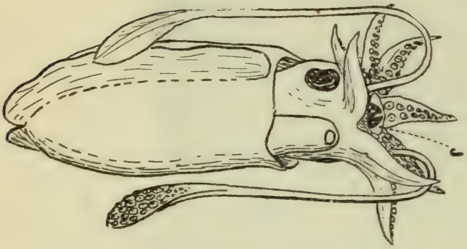
Indeed, who shall say that the intense, yet undefinable, charm that the ocean has for so many of us is not the awakening of an hereditary memory, a dim recognition of our long-deserted home? And in this connection that subtle observation of Woods Hutchinson, that our tissues to-day are ninety-nine per cent. marine, living only while immersed in the blood-plasma, a saline solution, while the odd one per cent.,—the epidermal structure,—is dying from drought, is pregnant with meaning.

FIG. 4.



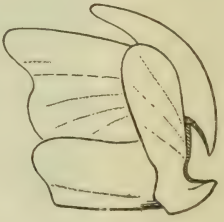
Radula of Winkle.

FIG. 5.



Cuttle-fish, showing Beak.

FIG. 6.



Beak of Cuttle-fish.

Among the ranks of the Lamellibranches are genera, as Lithodomus, whose works are shrouded in mystery. Certain it is that, without any apparent means, this singular bivalve excavates smooth, capacious holes in stone or coral reefs in which to dwell. He is, in fact, a cave-dweller who makes his own cave. Turning now to the higher mollusca, the *radula*, or lingual ribbon, a long, tongue-like body, thickly beset with rows of recurved, horny teeth, is common to both Gasteropods (snails and the like) and Cephalopods (cuttle-fish, squid, octopus, etc.), both of which classes have heads. It is used after the manner of a rasp.

The number of rows, the form and comparative size of these teeth, prove valuable data to the conchologist in the separation of the various genera of Gasteropods, since each genus possesses a fairly constant "lingual dentition." Teeth as a factor in classification are thus seen to immensely antedate not only mammalia, but all vertebrates whatsoever. A typical radula, that of the winkle (*Fulgur carica*), a carnivorous Gasteropod, is included in the collection and figured herewith. In addition to the radula, the Cephalopods, highest of mollusca, are armed with a horny beak, resembling that of a parrot, except that the upper mandible closes *within* the lower. The armed jaws are demanded by the ravenous carnivorous appetites of these terrible creatures. With one solitary exception (the nautilus) these jaws are horny. The specimen shown is the beak of a cuttle-fish (*Sepia fillouxi*).

### *Effect of Increased Specialization.*

In this brief inspection of the typical groups of invertebrates with reference to their oral armament, one can hardly fail to observe that a gradual necessity for lacerating and comminuting organs arises as we advance along the line.

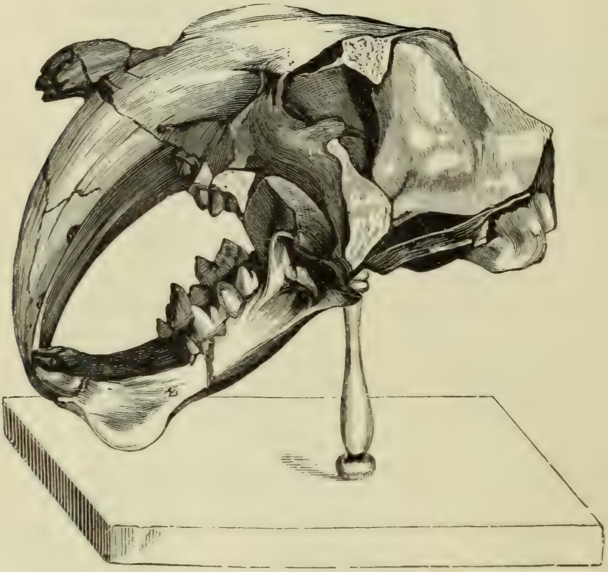
Whence springs this demand? What stimulus calls these parts into being?

As we rise in the scale of animal life, from the naked protoplasm of the amœba or monad toward the vertebrates, an ever-growing complexity of *structure*, coupled with a sharper differentiation of function, is encountered. Division of labor is born. Not only are motor and sensory organs developed, and circulatory, nervous, alimentary, and reproductive systems elaborated, but various provisions for defense are added, so that it comes to pass that the animal who would feed upon one of these armored forms must be able not only to catch his prey, but to pierce its armor as well. The history of the struggle between the eater and the eaten has been imperishably recorded on bones and teeth. In one respect it singularly parallels the history of naval warfare. So long as the wooden frigate represented defense, the improvements in artillery were but trifling. When the first iron-clad (*invented* in America, *built* in France) was built, it was confidently believed to be impregnable. Yet within a comparatively brief period guns and projectiles powerful enough to pierce its armor-plating were invented, and for many years improvements in armor have been progressively nullified by corresponding improvements in armament and in explosives.

So, too, with animals. The mollusk no sooner secreted a shell than its enemy contrived a way to drill a hole in it, or a great fish developed pavement teeth wherewith to crush said mollusk, shell and all.

Among early mammals the Edentates were represented, not by the puny tribe of these latter days, but by gigantic forms, some with massive external armor (the armadillos); others with the thickest of skins and the burliest of bodies, as protection against their carnivorous enemies. (The Glyptodon, an extinct armadillo, and the Megatherium, a sloth, also extinct, represented in our collection, are of this group.) But a contemporary carnivore, stimulated, doubtless, as the late Dr. Newberry shrewdly suggested, by the necessity of piercing these huge bulks to a vital spot, specialized in the matter of canines, until presently his progeny were able successfully to cope with the giant Edentates of the South American pampas and the ponderous pachyderms of tertiary and quaternary Europe and Asia. The skull of that formidable cat known to science as *Machairodus neogaeus*, popularly as the saber-toothed tiger, presents the most remarkable example of extreme specialization in canines to be found in the entire range of the Fissipedia, or terrestrial carnivora, and excelled in the Pinnipedia only by the tusks of the walrus.

FIG. 7.



Saber-toothed Tiger.

*Vertebrate Animals.*

Continuing our survey of the vertebrata, a certain similarity of structure may be traced, running through all the classes, a feature not observed among the invertebrates. Thus, they are nearly all bilaterally symmetrical (externally); they never bear more than two pairs of *paired* locomotor appendages; with the solitary exception of Amphioxus, all agree in the possession of a head, and all, without exception, have a vertebral column, either osseous or cartilaginous, or, represented by its rudimentary precursor, a notochord.

So, too, nearly all vertebrates agree in the possession of true teeth, either horny or calcified. The former are merely hypertrophied cells of the epidermis, surmounting long papillæ,—a sort of *oral corn*, developed as a protection against friction.

Cornified teeth are found in certain fishes and batrachians, and the permanent teeth of the Ornithorynchus—that bird-like, egg-laying mammal—are of this type. Calcified teeth, however, are the rule among vertebrates. They are classed, with hair, feathers, scales, and scutes, as true dermal or enderonic appendages, being developed from the oral epithelium by a gradual permeation of the matrix, or tooth-germ, with lime-salts,—a sort of living fossilization.

Although very difficult to associate these hard, stony bodies with the soft, naked cuticle of man, the transition is easy if we approach the problem by the study of dental development in a less specialized and aberrant type.

### *An Erroneous Point of View.*

Our entire conception of anatomy is afflicted with mental strabismus, from our antique habit of using man as the *type* with which all other forms are compared, instead of wisely relegating him to his proper zoological position of a highly specialized and aberrant species,—in fact, a structural freak. Our anatomical treatises would read as strangely to the great majority of the mammalia as they would to us if written by an elephant, an animal, by the bye, whose structure approaches the human in many important particulars. The elephant would doubtless note that "most of the *lower* animals (the italics are mine), including that singular form, man, are distinguished by a ridiculously rudimentary nose and an atrophy of the superior median incisors. They are all degenerate in size, and exhibit a feverish activity incompatible with a contemplative and philosophical mind," etc. The average quadrupedal point of view would be far more nearly typical than our own. Thus, the nomenclature of the teeth in use in medical and dental schools is singularly ill adapted for general vertebrate description. Of our *incisors*, *cuspids*, *bicuspids*, and *molars*, two are grossly misleading; for, while a canine is always a cuspid, the converse is not true, the anterior premolars of many mammals being of this type, while *bicuspid* describes the *premolar* in but few orders other than primates.

But to "return to our mutton:" An invagination or pushing inward of the external skin is the first step in the formation of either the mouth or the anus of the vertebrate embryo. Now, as long ago observed in species whose external skin bears enamel-covered scales or denticles, as the sharks, the transition from external scales to internal teeth is merely one of position and changing function, without modification of general form or method of attachment.

### *Teeth of Elasmobranchii.*

In sharks and rays the teeth are never fastened to the jaws, but remain anchored in a modified mucous membrane, the functional row in front, the numerous (five to seven) rows of growing teeth behind. These latter are brought into position by a gradual creeping forward of the tooth-bearing membrane over the underlying jaws. When a row gets too far forward, it drops out, the adjacent posterior row taking up the position and functions of its predecessor. Had some accident of evolution stimulated the psychic growth of the Elasmobranchii, as it did that of the primates, lifting them, instead of us, to mental pre-eminence, we can be assured that, to whatever stage of civilization they might have attained, no dentists would have arisen in the shark tribe. What a sinecure our Committee of Ethics would be, did the converse hold true!

### *The Dental Tissues.*

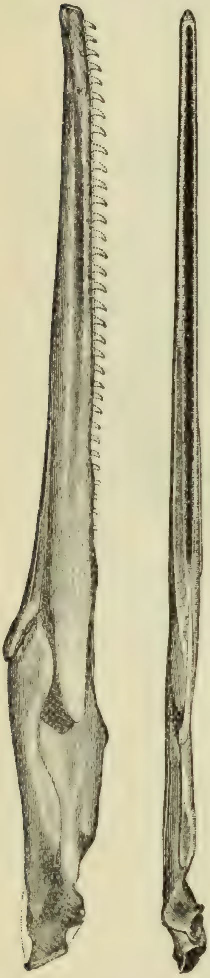
Accustomed as we are to use the human animal as the type, it occasions some surprise to discover that the "three dental tissues," dentin, enamel, and cement, are by no means universally present in the teeth of vertebrates. Dentin alone is ever present; enamel is frequently lacking, as in many fishes, a few reptiles, and, among mammalia, in many Cetacea (whales), a few marine carnivora, and all the Edentates. The mandibular teeth of the sperm-whale and the tusks and molars of the walrus, in the collection, are devoid of enamel, being formed of dentin surrounded by cement. There is reason, however, to believe that absence of enamel is an acquired condition, since an enamel-organ is *developed,* as proven by Tomes, in at least one family of Edentates, in all of which order, as above noted, the teeth are devoid of this tissue.

Cement may be entirely absent, as in the teeth of snakes; it may completely cover the root, as in man, or the crown as well, as in most Ungulates (hoofed animals). The *typical* position of cement is *outside of the enamel,* where it probably exists in the young human tooth as a portion of the much-debated Nasmyth's membrane.

### *The Typical Tooth.*

Again, the majority ruling, simple conical teeth, either fixed on end by ankylosis or held in position by membrane, must be taken as the vertebrate *type.* By far the larger number of fishes, batrachians, and reptiles develop such simple teeth. Very rarely in fishes and batrachians, and in but a single order of reptiles (Crocodilia), are the teeth implanted in distinct sockets, as in mammals, although an alveolar groove—quite open in the sperm-whale, more contracted in the extinct reptilian Ichthyosaurus, and with rudiments of partitions in some examples of Hesperornis—preceded alveoli, and was of more general distribution.

Fig. 8.

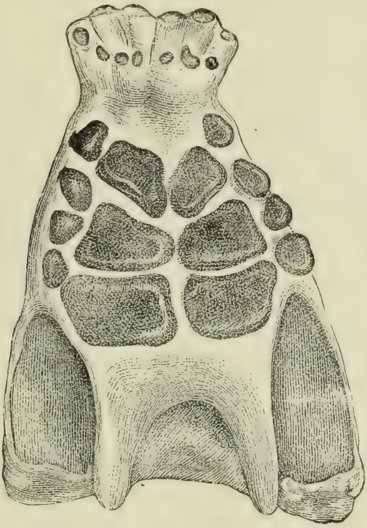


Left Lower Jaw of *Hesperornis regalis*, Marsh; one-half natural size; side view and top view.

### *Evolution of Alveoli.*

Seldom has evolution been more beautifully demonstrated than by Professor Marsh in those ancient toothed birds of the cretaceous, the Odontornithes, which his investigations have made known to science. Here are the almost imperceptible stages of transition from alveolar grooves to sockets. The Hesperornis before mentioned, occupying the order Odontolcæ (teeth in grooves), exhibits considerable variation in the numerous species figured in Professor Marsh's monograph. In one the jaws have open grooves with parallel sides; in another, faint constrictions, producing a scalloped border, are found; while in yet another, rudimentary partitions appear. Finally, the Ichthyornis, another toothed bird, having acquired distinct sockets, is placed in a separate order, Odontotormæ (teeth in sockets).

FIG. 9.



Skull of *Placodus*, an extinct Saurian.

### *Restriction in Number of Teeth.*

Contemporary with alveoli, a gradual tendency both to restriction in number and to the development of a definite number of teeth in a given form doubtless arose. Only approximately constant in number in the various species of crocodiles (in whom the right and left series are seldom identical in number), a more arbitrary limitation marks the mammalian dentition, particularly in the higher orders. It is interesting to note, in certain species, as Dasyurus among marsupials, a marked tendency to develop supernumerary teeth. Mammals as a class, however, are singularly restricted as to the number of teeth present, for, whereas the *typical mammalian dentition* (which, by the way, few of them possess) is three incisors, one canine, four premolars, and three molars on each side of each jaw (written $i\ \frac{3}{3}\ c\ \frac{1}{1}\ p\ \frac{4}{4}\ m\ \frac{3}{3}$), or 44, the number of teeth present in a vertebrate may range from many scores, in certain lizards, to hundreds, and even thousands, in some fishes.

### *Location of Teeth.*

When teeth appear upon the roof of the mouth in man we deem them abnormal, yet there are time-honored precedents for the position assumed, since in some reptiles, in many batrachians, and in most fishes palatal teeth are the rule. Batrachian teeth generally occur on the intermaxillaries, superior and inferior maxillaries, vomer, and palatines, and occasionally upon the parasphenoids and pterygoids as well. Those of fishes may cover all the osseous and cartilaginous parts of the buccal cavity, the branchial arches, and, in rare cases, even the *nasals* and the occipital, or they may develop external to the mouth, as in the saw-fish (*Pristis*). The only edentulous bones in the oral region of many fishes are the *true maxillaries.*

### *Anchorage.*

Implantation, truly so-called, is but one of many methods of attachment. It necessitates alveoli or grooves, and is distinguished from other forms of anchorage by the term *thecodont.* Teeth may be attached indirectly to the jaws by the interposition of a modified mucous membrane, as, throughout life, in sharks and rays and in the young of many true fishes. In the adult of many fishes, particularly the ganoids and teleosts, an osseous pedicle, developed from the underlying bone, becomes firmly ankylosed to the base of the tooth, to be resorbed when the tooth is lost. This, the *alveolar eminence* of Owen, is peculiar to fishes. Direct ankylosis of the bases of the teeth to the jaws is the rule among certain lizards, and is designated as *acrodont*, as opposed to *pleurodont*, by which term are described teeth ankylosed to the *side* of a socket or groove, laterally fixed in the jaw, as is the case in a group of lizards, of which the Iguana is a type; or, as in the Pike or Angler-fish, certain of the teeth may be *hinged*, the hinge opening *inward*, thus permitting easy entrance to living prey, after which, springing back to the erect position, they offer a formidable obstacle to egress.

Of living vertebrates, only mammals possess teeth implanted by two or more roots. For many years the oldest known evidence of the class, a couple of minute teeth, discovered in 1847 by Professor Pleininger, of Stuttgart, in sand from the Rhætic formations of the triassic period, were by this feature identified as mammalian, although hidden among the teeth and skeletal fragments of countless fishes and saurians. A small carnivorous mammal was indicated as the only possible possessor of these teeth, and accordingly *Microlestes antiquus* arose, phœnix-like, not from his ashes, but from his molars.

### *Number of Successional Series.*

Another important point wherein mammals differ from the rest of the vertebrates is in the number of sets of teeth erupted during the life of the individual. Odontologists recognize three distinct types of dentition, looked at from this standpoint, as follows:

*Monophyodont*, developing but a single set of teeth.

*Diphyodont*, developing two sets, an earlier, or deciduous, and a later, or permanent set.

*Polyphyodont*, developing teeth as required, without restriction as to number of successors.

Furthermore, the method by which the new tooth takes the place of its predecessor is variable. Thus, it may be by a vertical movement, as in man and most mammals, certain reptiles, and even in some fishes, as the trigger-fish (*Balistes*).

Or the young tooth forming at the side of its functional progener may laterally tunnel into the base of the latter, and, developing, lift it out of the jaw, as in Varanus, a lizard.

The permanent tooth may develop at the side of its deciduous predecessor in mammalia, as is the case with the canines of the Felidæ. (The kitten's skull in the collection illustrates this point.) Thus only is it possible to develop the new canine without disarming the animal during the period of eruption, as would result were the deciduous canine rapidly resorbed. Horizontal procession may be the method of renewal, the worn anterior tooth moving forward to make room for the new tooth, as is the case in the elephant. A similar mode of succession characterizes the parrot-fish (*Scarus*). Lastly, progression by rotation forward over the jaws of a tooth-bearing membrane, as already noted in the sharks.

### *Differentiation of Teeth.*

The teeth of the majority of both monophyodont and polyphyodont vertebrates are simple in form, while those of diphyodont animals, embracing most of the orders of the mammalia, are specialized; that is, they are differentiated as incisors, canines, premolars, and molars. This differentiation, due to long-continued stress and stimulation, constitutes the mammal's sole claim to dental superiority. We distinguish this diversity in form and division of labor of the teeth by the term *heterodont*, as opposed to *homodont*, where the teeth are all much alike in form and size. A *heterodont dentition*, using the term in Owen's original restricted sense, is found only in mammalia, although numerous examples of a partial differentiation may be cited among fishes and reptiles. To some of the former class, in fact, *heterodont* is a necessary appellation.

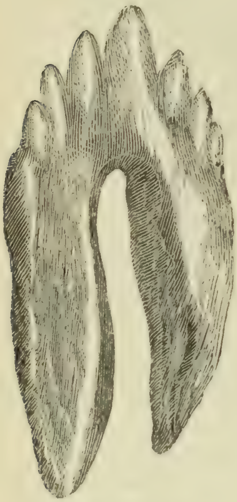
As a rule, then, diphyodont mammals are heterodont, and monophyodont and polyphyodont animals homodont, although to this statement many exceptions may be taken. Thus, the wolf-fish (*Lupus*) exhibits great diversity of form in its denture; the entire armadillo sub-order (*Loricata*) have simple teeth, but these are preceded by a deciduous set.

A hint of the ancient affinities linking the modern diphyodont mammalia with their polyphyodont reptilian and piscine contemporaries is contained in the circumstance, proven by recent investigations, that in every case where the dentition is restricted to two series, germs of a third (and possibly of a fourth) series are found. This may explain the appearance, in rare instances, of a third set of teeth or of a crop of simple denticles in man.

## *Evolution of the Heterodont Dentition.*

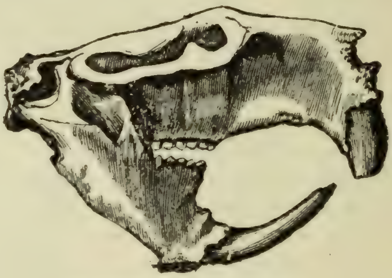
In the differentiated teeth of the heterodont mammalia the cheek-teeth or molar series have enlarged their crowns, consisting, typically, of several cusps, either paired or alternate, and occasionally much disguised by blending, connecting ridges, or modification in form. It is probable that the many diverse types of molar are all derived from a simple triconodont type, such as persists to-day in certain marine carnivora, the sea-leopard (*Ogmorhinus leptonys*), the gray seal (*Halichoerus grypus*), and others. From the triconodont type, the transition to the tritubercular superior molar, so common in the Puerco epoch, is easy, and the various steps by which the quadritubercular, quinquitubercular, and sextitubercular molar was probably derived from this triangular form have been most ingeniously described by Professor Cope in his brilliant essay, "On the Homologies and Origin of the Molar Teeth of the Mammalia Educabilia." The triconodont type itself doubtless arose, as suggested by Cope, from the simple conical tooth by the addition of tubercles, stages of which evolution may be seen in the teeth of sharks, the Squalodon, and Zeuglodon, among extinct cetacea. In predaceous mammals the teeth located at the angles of the mouth, used to transfix and hold struggling prey, also became thicker and longer than the incisors, but with simple, conical crowns. As the lower canine, closing outside of the upper, would be drawn forward (and with it, of course, the lower jaw) by an increase in diameter of the superior canine, or the lower, or both, we have here, in the evolution of the canines, an example of nature's method of "jumping the bite" some ages ago. In rodents, whose canines

FIG. 10.



Tooth of *Zeuglodon*.

FIG. 11.



Skull of *Castoroides Ohioensis*.

are lacking, the immensely developed central incisors indicate that these teeth perform the heaviest and most powerful labor of which their jaws are capable.

The fossil beaver of the collection is a notable example of specialized incisors. (See Fig. 11.) This enlargement of a tooth in transverse diameter is believed to be the result of the stimuli of impacts upon the developing tooth-germ, handed down, with added accretions, from generation to generation. As the pressure exerted by the masseter and temporal muscles was greatest in the immediate vicinity of the application of power,—*i.e.*, of their insertion,—we should find the teeth in this position the largest. Not only is this true of the molars generally, but the relative size of these teeth, when unequal, depends upon location, those directly beneath the anterior border of the masseter being the largest. In the carnassial teeth of carnivora an anterior progression of the insertion of the masseter has been accompanied by a corresponding movement in the development of the teeth, until we have here a *premolar* occupying the position of greatest pressure and attaining the largest size of all the cheek-teeth. The *mechanical* origin of the molar series is further proved by the researches of Dr. Galippe upon the *specific gravity* of the teeth,* in which he found that the molars have a greater density than the incisors. Chemistry has also cast a ray of light on this interesting point in evolution. C. S. Tomes states† that his investigations indicate very plainly that the molars and bicuspids are more highly calcified than the incisors and canines. Man is by no means the only species in whom the posterior molar tends to degenerate. In the cats, to use an extreme example, both third and second molars have completely disappeared, while the first superior molar is a mere functionless denticle.

### *Causes of Diminution in Number of Teeth.*

Beside this degeneration through disuse, we find, with increased specialization, a gradual diminution in the number of the teeth, due to two distinct causes:

*First.* The progressive enlargement of the more actively functional molars results in the displacement of the less useful teeth by their more energetic neighbors.

*Second.* A shortening of the entire jaw to increase the power of the bite. This decreasing of the adverse leverage of the jaws likewise results in the crowding out of such teeth as can be more readily spared. Thus, of existing Eutheria (the Monodelphia or placental mammals), but four genera have the full complement of forty-four teeth. Of the dentally specialized Fissipedia (terrestrial carnivora), the Canidæ have, as a rule, forty-two teeth, as follows: $i\,\frac{3}{3}\ c\,\frac{1}{1}\ p\,\frac{4}{4}\ m\,\frac{2}{3} = 42$. Here the superior third molars $(\frac{m^3}{\ })$ are suppressed.

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*"Recherches sur le Proprieties Physiques des Dents." Society de Biologie, 1884.

†*British Journal of Dental Science.*

In certain Asiatic species the inferior third molars $(\frac{\ }{m^3})$ are also lacking, while the crab-eating dog of South America (*Canis cancrivorus*), whose diet is not strictly carnivorous, occasionally presents the typical forty-four teeth.

The omnivorous bears (*Ursidæ*) develop forty-two permanent teeth, some of which, however, are lost before the animals attain maturity.

Of Procyonidæ, the raccoon has forty and the panda thirty-eight teeth, the latter having lost the superior fourth premolar $(\frac{p^4}{\ })$, in addition to both inferior and superior third molars $(\frac{m^3}{m^3})$; the dentition of Cercoleptes (the kinkajou) is reduced to thirty-six, he dropping the inferior fourth premolar $(\frac{\ }{p^4})$ as well. Of Mustelidæ, the common skunk (*Mephitis mephitica*) presents but thirty-four teeth, the superior second molar $(\underline{m^2})$ being suppressed, while in the skunk of Tropic America (*Conepatus mapacito*) the cancellation of $p^3$ reduces the number to thirty-two.

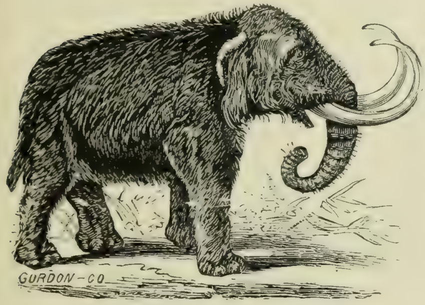
Finally, among the Felidæ, or cats, the highest carnivorous type, the dental formula is reduced to thirty, as follows: $\text{i}\ \frac{3}{3}\ \text{c}\ \frac{1}{1}\ \text{p}\ \frac{3}{2}\ \text{m}\ \frac{1}{1} = 30$.

It is apparent that here, in the mammalian dentition, a struggle for existence has centered,—a vendetta extending through countless generations, and of which the survivors, the battle-scarred veterans of the alveolar arch, are pre-eminently "the fittest."

### *Varied Functions of Teeth.*

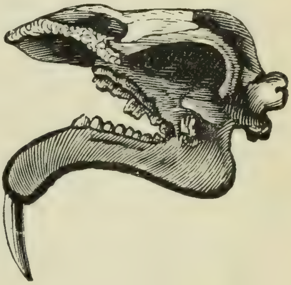
Alimentation is by no means the only function to which these organs are subservient. Among primates, where the limbs attain their highest development as prehensile organs, the teeth seem to have lost, in great measure, this primitive function, almost their only one in reptiles and in many fishes. Tactile sensibility is, however, still retained, probably in greater perfection here than in the fingers, calloused by climbing, of all but the highest type, the civilized (softened) races of man. The savage of to-day still uses his teeth as a court of final appeal in examining unknown substances. The universal habit of babies of all races of putting everything that comes within their grasp into their mouths is not, as commonly believed, the manifestation of an insatiable appetite, but an instinctive method of physical diagnosis, to be suppressed only by continual chiding and punishment. Here, also, in the herbivorous or omnivorous primate, the *sexual tooth*, or canine, is commonly much developed in the adult males, where it is utilized, during the breeding season, in those combats which, as Darwin pointed out, result in a "sexual selection,"—in a progeny sired by champions, and in whom the features that contributed to victory are preserved and further developed by their heirs. The polygamous Ungulates likewise develop armed males, existing members of which order may bear horns or antlers, or enlarged canines, never both. The horse, among Perissodactyla (odd-toed Ungulates), and the wapiti and musk-deer, or Artiodactyla (even-toed Ungulates), are examples. The extinct Dinoceros and its gigantic allies, nevertheless, were furnished with not one, but *three* pairs of horns, in addition to the long, lanceolate canines of the male. A sexual development of the *incisors,* notable for its lack of symmetry, characterizes the male narwhal (*Monodon monoceros*), in whom the *left incisor* projects as a huge, sinistrally convoluted ivory tusk, sometimes attaining a length of seven or eight feet in old bulls. (A fine example of this tooth is to be seen in the collection.) The right incisor, although present, remains rudimentary within the socket, as do both of the incisors of the female. Sometimes, however, the *right* tusk of the male also erupts, equaling the left in length. (A narwhal presenting this rare condition was exhibited at the Berlin Fisheries Exposition of 1878.) This tooth, the only example of unpaired development or asymmetry in the whole range of existing mammalia, finds its parallel in the lower incisors of the extinct Mastodons, the left of which, in the American species at least, sometimes projected from the male jaw as a short, straight tusk. The paired tusks of the elephant and mastodon, huge superior median incisors, are the largest teeth known. Those of *Elephas primigenus,* an extinct Northern species, were thirteen feet eight inches long and forty inches in circumference at the base, producing, by their leverage, a downward strain of nearly two thousand pounds on the inferior walls of their alveoli. The immense frontal depression seen in the skulls of all elephants, living or extinct, marks the insertion of the huge muscles needed to wield their incisors. While larger in the males, both sexes of Proboscidians are armed with tusks as weapons of defense.

FIG. 12.



*Elephas primigenus* (Mammoth).

FIG. 13.



Skull of *Dinotherium.*

That strange transitional type, the Dinotherium (a cast of whose huge skull confronts one on entering the Museum Hall), developed its inferior incisors, in both sexes, as *downward-pointing* tusks, which probably served as picks in its aquatic exploration of ancient river-bottoms. The functionally similar tusks of the walrus, also exhibited, are superior canines. The upward- and backward-pointing tusks of the Babiroussa, useless as weapons, serve to protect the eyes of this hog when running through thick undergrowth. The inferior median incisors of the kangaroo are said to be utilized as scissors, the sharpened mesial border of one working against that of its neighbor by independent movements of the two rami, which retain a mobile, ligamentary union at their symphysis. Thus, it is asserted, did this pest of the Australian cattlemen *shear* the herbage so closely that sheep starved by thousands on kangaroo ranges. The incisors of most lemurs protrude in a manner that unfits them for prehension. We are therefore prepared to learn that they are employed as a comb during the animal's toilet. The nippers of the Ungulate, the scrapers of the Carnivore, the forceps of Insectivores, are incisors. The poison-fangs of the rattlesnake, analogous to canines both in function and position, offer the earliest pattern of a hypodermic needle,—a pattern that actually suggested placing the orifice of the duct of the modern needle on the side instead of at the end, as in the earlier canula.

The molar series, when differentiated as such, are strictly masticatory or cutting in function.

### *Equality in Height of Teeth a Primitive Characteristic.*

We have seen that increased specialization of function, so marked in the mammalian dentition, is concomitant with differentiation in form and size. Thus, the teeth of the more highly specialized modern orders present diversities in height, profound in Carnivora and Rodents, less marked in Cheiroptera, Insectivora, and Ungulates, but seldom entirely absent.

The existing Cetacea (Mesoplodon excepted), the Edentata, in common with the extinct Achænodon and Hyopsodus,—those primitive Ungulates of the early eocene,—have subequal teeth. Of primates, absolute uniformity in height seems to be not only confined to man, but to civilized man at that, the male aborigine of many races not infrequently exhibiting in a slight degree the so-called *simian* feature of enlarged canines. It has been suggested to me by Dr. Hutchinson that the mastoid process, the greater size of which in the male may be classed as a secondary sexual characteristic, is developed in direct relation with the canine, for the *sterno-cleido-mastoideus*, which takes its origin here, is especially concerned in *tipping the head to one side* and in *rotating it*, motions that are used respectively in attack and in shaking the captured prey. A dog holding a rope by his canines well illustrates these actions; whereas, if the rope be held by the incisors, the head is kept level, while a strong backward pull is his usual procedure.

Contemporary with this equality in size of the ancient generalized (and modern degenerate) denture existed an uninterrupted series—an absence of *diastemata*—of the spaces separating certain of the teeth in all existing mammalia save man.

Some species of Titanotheria, the Achænodon, the Anoplotherium, the Homalodontotherium,—in fact, many of the early tertiary mammalia,—exhibit this primitive feature, so conducive to caries and oral deformities. The tooth-brush, then, is a necessity, not of a specialized, but of a very old-fashioned, type of denture.

### *Zoological Chauvinism.*

Yet the same smug self-complacency that prompted "Little Jack Horner," upon finding the historic plum, to exclaim, "Oh, what a good boy am I!" permeates the pages of too many narrow text-books on the structure of man.

It is a survival of an age when to question the physical superiority of man over "the brutes," as all other mammals were contemptuously termed, was rank heresy. The very titles of the once-famous "Bridgewater Treatises" (now buried in oblivion, although antedating the "Origin of Species" by but twenty-six years) serve to illustrate the curious distortion of facts,—the childish theories of their scientific authors. Thus, we have Kidd's "Adaptation of External Nature to the Physical Conditions of Man" (1833), Chalmers's "Adaptation of External Nature to the Moral and Intellectual Conditions of Man." It was this school of philosophers who discovered that the horse's molars were separated from his incisors by a gap (diastema) solely to enable man to govern him by means of a bit, though why we do not subdue the lion or the wild boar by the same means was not explained. Nor had Professor Marsh then given to the world the pedigree of this noble animal, whose diastema is now known to have existed ere human foot trod *terra firma*. How fortunate for Bell's argument that he selected the *hand* rather than the *foot* of man for his famous monograph on our structural superiority, for although the human hand is pre-eminent as a prehensile organ, in the latter extremity, as in his teeth, the horse is immeasurably our superior!

(To be continued.)

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## A SYSTEM TO ASSIST IN THE IDENTIFICATION OF CRIMINALS AND OTHERS BY MEANS OF THE TEETH.

BY B. BARRYMORE MARCO, D.D.S., NEW YORK, N. Y.

(Read before the First District Dental Society of the State of New York, December 14, 1897.)

In this advanced age of civilization, where all branches of science are being perfected, dentistry has not taken a back seat, thanks to the diligent researches of men whose sole aim has been to make this branch of medicine a thing to be respected by not only our professional brethren, but the public in general.

Not very long ago there was a little stir among us in regard to the use of the dentist in the army and navy. Although seemingly approved by all, it must have died out; why, I do not know, unless it was for the want of some active man to push it.

Now I read to you to-night a paper on a subject that has been brought up time and again, and approved by all of us; but I do not propose to stop and let the matter drop after the reading. I have been working on this subject for some time, carefully making inquiries here and there—sounding my depth, so to speak.

In preparing this paper, I had the good fortune in being able to explain my system of identification by means of the teeth to one of the greatest criminal judges of the age. Being interested in all matters pertaining to criminal and all scientific subjects, he became deeply interested, promised me his assistance, and advised me to go on with it.

In looking over the back numbers of the DENTAL COSMOS, I found that this subject had been very ably dealt with by Dr. Alton Howard Thompson, of Kansas, Dr. E. K. Wedelstaedt, and Dr. Oscar Amoedo, of Paris.

Dr. Thompson gave us a very useful plan for measuring the "dental arcade" and the "arch of the palate." Dr. Wedelstaedt states in his article that in more than one hundred sets of teeth he examined he has never found two centrals or laterals alike.

Dr. Oscar Amoedo's article, as read by him before "The International Medical Congress of Moscow," Dental Section, gives us a very graphic and splendid description of the identification of victims of the catastrophe in the "Bazar de la Charité," which occurred May, 1897. He says, "In this terrible fire one hundred and twenty-six persons met their death. Recognition proceeded rapidly, and all but thirty bodies were identified. Of these latter, many had the cranium entirely denuded and the integuments of the face blackened and hardened by the fire. They were so badly burned and disfigured that identification was not expected.

"It was then that the dentists were called in. But their task was far from easy, however. It was found that the teeth of the victims had withstood the fire, and, as our *confrères* were in possession of charts of the mouths of each of their patients, nearly all of the victims were given back to their families. There were many of the most distinguished people of Paris among the corpses."

I have here another illustration of how a long dispute over a body was settled by the dentist. After the assassination of President Lincoln, John Wilkes Booth took refuge in a barn, situated on a farm in Virginia, across the Potomac. The United States Cavalry pursued, surrounded the barn and fired it. Booth burst forth and attempted to escape, but a sergeant shot and, as was supposed, killed him. It became a serious question as to whether Booth was killed. Many claimed he had escaped and was living in foreign parts under an assumed name. This dispute continued for years. Shortly before the death of Edwin Booth, the celebrated actor, permission was granted to remove the remains of the supposed John Wilkes Booth to the family burial ground in Druid Hill Cemetery, Baltimore. Of course, the family could not identify the remains. A dentist who had treated the family for years, also the teeth of the deceased, was brought specially for the purpose. Upon making the examination, he at once identified them from a certain filling that he had inserted in one of Booth's teeth, and also a striking and peculiar formation of the jaw that had impressed him at the time of the operation. This identification was positive, and settled the fact that Booth had been shot.

It has only been recently that our chief of detectives, Captain McClusky, identified a criminal from the West by means of a description furnished him. The striking feature of the description was the peculiar gold filling in his teeth.

I could go on and give you many more instances regarding the identification of people by the teeth, but now I must arrive at the real purport of this paper. My idea is to introduce this system of identification into the Detective Bureau of New York. Once established here, it will soon make its way into the army, navy, and insurance companies. By the means of this system, deserters of the army and navy, criminals, and, in fact, all persons, can be more readily detected than by taking note of any physical peculiarity, which can easily be modified or changed.

My system is as follows:

There must be a carefully prepared chart of the thirty-two teeth in the mouth, so that the examiner can have it before him and mark down each peculiarity as it presents itself.

*First.* Color, shape, and size of the teeth.

*Second.* Note any irregularity of the teeth.

*Third.* If any teeth are missing, which ones.

*Fourth.* Gold crowns, pivots, or bridges.

*Fifth.* The filling of each tooth, and what materials used.

*Sixth.* Any carious teeth.

*Seventh.* Note if any plate is in the mouth, and of what material it is composed; number of teeth on same; also size, shape, and color of teeth and plate.

*Eighth.* Note the four basal temperaments.

*Ninth.* Shape of arch, as saddle or V.

*Tenth.* Formation of the lips.

Let us take John Smith, prisoner. His picture is first taken; then the Bertillon system is next used for measurements, etc.; now let us add the identification by means of the teeth.

Teeth have a yellowish cast, longer than they are broad, quite large, firm articulation; lips full; upper jaw right cuspid far out of line; large gold filling in upper left central; upper first bicuspid, gold cap; in lower jaw, left central and lateral missing, left cuspid carious; arch, saddle-shaped; his temperament is bilious.

Thus, you see, we have here a description of a man's mouth as true and perfect as a photograph of his face.

The question might arise, Suppose he extracted his teeth? Well, he would have to take out almost every tooth in his mouth to deceive the carefully prepared chart.

A man may shave his beard and moustache, his hair and eyebrows; he may contort his face so as to change measurements; he may cross his eyes, twist his mouth, affect lameness or a stoop; but unless he extracts all of his teeth there will be some tell-tale among them that would betray him. As you know, there is no certain means of identification, but, in my opinion, the teeth are the most positive. You cannot change the malformation of a jaw, nor the irregularity of teeth, after a certain age.

Now, we realize that any layman could not give a good and accurate description of the mouth; but the system can be so simplified that any ordinary country constable could both send or identify a description of the mouth; and in the cities, where the head officials are mainly men of marked intelligence and education, they could, with a little instruction, in a short time fill out a perfect description.

This system, after consideration, must appeal to you as being not only for the advancement of dentistry, but a useful addition to our already valuable Detective Bureau. What I ask in return is your co-operation in this matter.

# CORRESPONDENCE.

## "FACULTIES VS. EXAMINERS.'

TO THE EDITOR OF THE DENTAL COSMOS:

*Sir,*—In the December issue of your magazine I find admitted to your pages a letter from a young graduate to which I take exception, and I ask space for a reply. In the realm of science the published opinions of writers must ever be open to discussion, and, if possible, refutation. The *ipse dixit* of no man should pass unchallenged, else science would suffer. The contradiction of a statement, however, in language which charges willful misrepresentation, is not only a departure from the customs of scientific debate, but is a breach of professional deportment which places the offender beyond the pale of professional recognition. I should consequently ignore this initial literary effort of the young graduate, were it not that he deals with a matter which has a somewhat important bearing upon a subject which at present is engaging the thought of a large majority of those who are striving for a betterment of existing conditions, and who, therefore, should have the facts as they are.

The writer quotes from an editorial in the August issue of *Items of Interest* a paragraph which reads as follows:

"Twenty-nine men applied for examination, of whom twenty-six were graduates. As an evidence of some knowledge of prosthetic dentistry, the candidates were required to bring a full set of teeth, invested ready for soldering, and to solder the teeth to the plate in the presence of the examiner. Not one of these twenty-nine men, twenty-six of whom were graduates, had invested their pieces so that there was any possibility, with the facilities at hand, to properly heat up the invested piece prior to throwing the flame of the blow-pipe upon the solder. In fact, a hot furnace fire would have been requisite. All had from three to ten times as much investment as there should have been. This is not a lack of preliminary education, but an evidence of poor training in the schools."

He takes exception to my statement that the investments were from three to ten times too great, and is discourteous enough to say, "Such a statement is not in accord with reason, and I believe to be greatly exaggerated, and therefore false." After accusing me of publishing a falsehood, he then endeavors to make it more probable that I did misstate the facts, by showing that I had no opportunity of learning the truth. He states that instead of being in the hot laboratory, I was using a palm-leaf fan in the front room.

Let me reply to this first. I did not attend the examination with the intention of devoting all of my time to the prosthetic work. I was present, however, during all of the morning and afternoon, and every minute was spent in a critical investigation of the details of the working of this board. I watched several men prepare and fill cavities; I visited the room where the written examinations were in progress, remaining there long enough to observe that one gentleman was diligently copying matter from his cuffs; and I spent several hours looking over the papers which had already been handed in. With Dr. Barlow I visited the laboratory, and saw several men attempt to solder their pieces. From a cursory glance, the invested pieces reminded one strongly of fairly large cobble-stones. I sat with Dr. Barlow for half an hour, and discussed the subject of investments with him minutely, obtaining full information. Subsequently, at the end of the day, all of the plates which had been completed were brought to me. Of these, one was shown where the candidate had united all of the teeth together, but had failed to fasten any of them to the plate, the result being that the teeth could be lifted from the plate, forming a horseshoe of backed gum teeth, each slightly tacked to its neighbor through the fact that the blow-pipe had melted the solder just enough to make it adhere, without really flowing. I was told that this man's investment was over six inches cube. Another piece was shown where six teeth at one side could be similarly lifted from the plate, while the remaining teeth were attached to the plate, but in no sense of the words soldered. These were the extremes; others showed great imperfections, and not one plate that I saw could have been made decently presentable by polishing. One did not need to see these investments to know that the fault was that such an excess of material had been used that without a furnace fire the plates could never have been made hot enough to receive flowing solder. This matter was fully discussed by the board in my presence, and I was informed that the investments which I had not actually seen were many of them worse than those which I did see, a statement which was in consonance with the completed work which I did personally examine.

As to the phrase "from three to ten times as much investment as was needed," it would perhaps suffice to say that, as my editorial was entirely impersonal, specifying no particular candidate nor college, I had a right to employ a phrase in common use among writers, without supposing that some young graduate would accept the words literally, as though I had been tabulating statistics. I doubt if any other reader supposed that I weighed all of the investments, computed what should have been requisite, and so arrived at my stated results. We hear that "ninety-nine out of a hundred marriages are failures," but we have a higher estimate of matrimony than the literal interpretation would indicate. I said "from three to ten times as much," beginning with "three," because neither "one" nor "two" are commonly made antecedents of the word "times." The phrase, therefore, was used figuratively, but oddly enough (lest this argument seem to be specious) it is a fact that my words were also literally true. Suppose that we take a large plate, two and one-half inches across, as well as antero-posteriorly. An investment measuring three and a half by three and a half by one and a half inches would give a uniform protection of half-inch of plaster to all parts. This would contain something less than twenty cubic inches of investment. The gentleman who failed to unite any of his teeth to his plate had a mass six inches cube, containing, therefore, more than two hundred cubic inches of plaster.

The young graduate, fresh from his Alma Mater, loyally declares that his professor is as practical as I. This is quite possible; yet he further claims that many of the pieces could have been properly heated up "with the facilities at hand, considered from the standpoint of the chair," at his college. In my editorial I declared that these pieces should have required "a hot furnace fire," and I imagine that many practical men will agree with me that a full denture should always be placed in a furnace, or at least a bed of charcoal, before pointing the flame. Perhaps even the beloved professor would admit so much. In conclusion, I wish to introduce a letter from Dr. Barlow, the examiner, written in reply to one from me asking his opinion in the matter:

"JERSEY CITY, December 24, 1897.

"DR. R. OTTOLENGUI, 115 Madison Avenue, New York.

"*My dear Doctor*,—In the December issue of the DENTAL COSMOS an article, "Faculties *vs.* Examiners," written by Arthur E. Guptill, D.D.S., seems intended to cast reflection upon the veracity of the editor of the *Items*.

"The particular paragraph referred to was, I supposed, by you used figuratively. As a matter of fact, nine-tenths of the invested cases offered at examinations are in excess of all reason, and I often wonder why students are instructed to so invest, and look for a successful soldering.

"The facilities given by the New Jersey board are all that is required for a successful result ordinarily, but with investments of five inches in diameter, bound with iron bars or sheet-iron casings, something more than the usual soldering apparatus of a dental laboratory is requisite,—possibly a blacksmith's bellows, etc. Our dental forefathers would have been chest-foundered in the effort, under the mouth blow-pipe system.

"I have often been inclined to advise candidates to trim off excesses, but forbear, fearful that should they fail on prosthetics they might lay it to a departure from previous instruction.

"The candidates before New Jersey's board are known only by numbers to the members of the commission, so that I cannot recall case of the writer of the article. Very truly yours,

(Signed) "F. C. BARLOW."

It will be observed that in this letter Dr. Barlow refers to investments five inches in diameter, and to others bound with iron bars and sheet-iron casings. It would be interesting to know at what schools these methods are taught, and whether these investments were among those which your correspondent thinks could readily have been heated up with a blow-pipe and without a furnace.

Very truly yours,
R. OTTOLENGUI.

NEW YORK, January 5, 1898.

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## ARTICULATION AND OCCLUSION.

TO THE EDITOR OF THE DENTAL COSMOS:

*Sir,*—I note in the current issue of the DENTAL COSMOS, page 1026, *et seq.*, a communication from Dr. H. H. Burchard, in which he takes exception to certain portions of my paper which appeared in the October issue (see page 790).

It would be beyond the scope of a mere "communication" to make such reply to Dr. Burchard's comments as would place the whole subject within the comprehension of those who have not made a special study of the subject under discussion.

I am therefore using his communication as the basis for a paper which I am now preparing for the first annual meeting of the Southern division of the National Dental Association, to be held in St. Augustine, Fla., February 22 to 25, when I will endeavor to place certain points in a little different light.

Suffice it here to say that Dr. Burchard was entirely in error in his interpretation both of my comments and of my mental attitude, as evidenced by his words, "explosively finding fault," "intemperate and ill-considered," etc.

My comments, or, if you please, *criticisms*, on Dr. Burchard's use of the words *articulation* and *occlusion* (in reference to dental articulators) were carefully considered, and were made purely in the interest of science as applied to dental prosthesis, and it is in the same spirit that I now feel it my duty to reply briefly to Dr. Burchard's communication, and hope you will allow space for the same in your valuable pages.

In the first place, I wish to commend for study the valuable papers of Dr. Bonwill on the mechanical and geometrical laws governing the articulation of the human teeth—the word *articulation* having been used by me, as I have been careful to state in my several papers, in the special sense given to it by Dr. Bonwill many years ago, the use of which, *in this special sense*, by this admitted authority and his numerous students and adherents having hitherto passed uncriticised; the word *occlusion* being used with an equally specific, though entirely different, meaning.

Having used these words in this specific sense, as clearly stated in my papers, referring exclusively to *interdental* articulation and *interdental* occlusion, it was only natural to infer that Dr. Burchard, in his very complimentary references to my work, should have used my words with my own meaning, as defined by Dr. Bonwill for use in this connection,—viz, the articulation and occlusion of artificial dentures in dental articulation.

I had said that full dentures which would *occlude* in Dr. Bonwill's articulator *would*, provided a correct bite had been obtained, *also occlude* in the mouth, but there was no assurance that they would *articulate*. Dr. Burchard, while writing in confirmation of my views, says that they will *not* occlude, thus making a statement reading the reverse of the fact, which to the average reader certainly looks like carelessness in the use of the words "occlusion" and "articulation." (See page 790, fifth paragraph.)

Until Dr. Burchard, or some other equally erudite scholar, shall supply us with two distinctive words to indicate the two radically different phases of "relationship between antagonizing teeth"—viz, (1) the position of the cusps of the teeth in triturating mastication, and of their incisive edges in biting, as differentiated from (2) the position of the teeth when the lingual cusps enter into the sulci of the opposing teeth (as when the jaws are tightly closed)—we must continue to use the words *articulation* and *occlusion* as differentiated by Dr. Bonwill, notwithstanding the unfortunate "double application" of the one and the "faulty application" of the other, "from a philological and an anatomical point of view."

Likewise, in his use of the words "parallelism of the planes of articulation and occlusion" the inference would be natural that the words under discussion would be used by Dr. Burchard as I had specialized them, differentiating "occlusion" from "articulation," as defined by Dr. Bonwill (in the last three lines of page 789, *et seq.*, October COSMOS). As Dr. Burchard disclaims having reference to interdental articulation, and as we have no concern with dental articulation in the purely anatomical sense,—that is, the relationship of the teeth with their alveoli,—I conclude, from a careful study of Dr. Burchard's communication, that in the phrase "parallelism of the planes of articulation and occlusion," as used by him in the article in Catching's "Compendium" (1896, page 376), that while by plane of "occlusion" he referred, as I did, to *interdental occlusion*, by the plane of "articulation" he has in mind, not *interdental articulation* as I used the term, but the plane of temporo-mandibular articulation, or, as I have perhaps "arbitrarily" called it, "the condyle path." If this term is objectionable, the phrase "plane of temporo-mandibular articulation" is perhaps more acceptable phraseology. In the consideration of a dental articulator, however, the words "planes of articulation and occlusion" would most naturally be understood to refer to *interdental articulation* and *interdental occlusion*, and my suggestions, therefore, neither were nor are "intemperate" nor "ill-considered."

WM. ERNEST WALKER.

PASS CHRISTIAN, MISS., December 29, 1897.

# PROCEEDINGS OF SOCIETIES.

## OHIO STATE DENTAL SOCIETY.

### FIRST DAY—*Morning Session.*

THE thirty-first annual session of the Ohio State Dental Society was held at the Neil House, Columbus, Ohio, commencing Tuesday, December 7, 1897.

The society was called to order at 10.30 A.M.; President L. E. Custer, of Dayton, in the chair. The minutes of the last annual meeting having been read and approved, the president read the annual address, as follows:

We are met for our thirty-first annual session. The work done by this society in the past and the good which it is yearly accomplishing need scarcely be brought to your notice. It has been my privilege in the past few years to be present at the meetings of the state societies of a number of different states, and, with the exception of the Illinois, I have found no better organizations and no more or better work accomplished than in our own.

The objection has been raised by the dentist who has not had the advantage of a college course, that the time of the meetings is taken up by college professors with papers and theories in which they have no interest. While some may think it a loss of time to listen to the professor, this class is growing smaller and smaller. The day, we think, is not far distant when every one in our dental societies will appreciate the papers that come from our teachers and the older heads, to the extent that they will not call every one a "fine-spun theory." We should regard it a privilege rather than a burden. For my own part, and I think I speak for a great many, it is a pleasure to occasionally meet our old friends, protoplasm, the Miller theory of caries, or even a group of alcohol radicals.

The sphere of the young practitioner is one of no less importance to the society and to the profession than the older ones. It is he who in time is to take the place where now stand those who are his seniors. The beginner is not only profited by attending a dental society, but he can be a benefit to the profession from the very beginning of his career. He need not wait till he is an old man before attending a dental society. Many a young man, upon finishing his college course, enters upon the practice of dentistry with the impression that he knows it all; that there is nothing further to be learned; that there are no more worlds to conquer, and that his attendance upon a dental society would be a loss of time and energy. The student, the progressive man, however, finds delight and profit in the dental society. He regards his college education only as a stepping-stone to higher attainments. He feels that in the college he only learned the index to a great library; that he has only learned where knowledge is to be found. Such an one appreciates the good to be derived from meeting with others in the search for knowledge. Longfellow has truly said, "The mind of the scholar, if you would have it large and liberal, should come in contact with other minds."

The young practitioner may not only be benefited by what he learns from the experience of others, but, if he immediately takes part in furnishing his share of the papers presented, he will himself be benefited thereby. If you do not know anything on a subject, write an essay upon it and you will be surprised to find how much you have learned.

The importance of the young practitioner and the good which he has accomplished in the progress of dentistry has not, I think, been fully accredited. Some of the most important achievements made in dentistry have been accomplished by very young dentists, and I think it may safely be said that the majority of the substantial advances made are due to men under forty years of age. Every young man who enters the profession focuses his lens upon an object, and sooner or later the truth will be known. He comes with a new mind, and, it may be, in using a lens of lower power, sees the very thing that has obstructed the vision of those older in the profession who are working, as it were, with higher powers.

For years our state has been made the dumping-ground for many of our neighboring states. Prior to the new law, in 1892, there was only an imitation of a dental law, but the character and integrity of the examiners had a wholesome effect.

Nearly every member of this society knows the great effort that was exerted to secure even the McMakin law, and, in the face of the bad state of things resulting from it, there is little encouragement to continue the effort. But it appears from the experience of the past that if the matter is taken up systematically, by introducing a single amendment at a time, we will in time have a better law than by the introduction of a whole new bill. The frame-work of the law, as it now stands, is good enough for the purpose, and it is but a matter of correcting it in detail; and in that way, in the end, a much more satisfactory law will be the result.

There is fresh in the memory of many here a dental meeting held in Detroit some three years ago. There has not been, since the Dental Congress of 1893, such a successful and fruitful meeting of dentists anywhere in our land. The promoters were so elated with the results that it was decided to hold another three years from that time, and the honor of entertaining the proposed meeting fell to Ohio.

The time is near at hand, and, this being the last meeting of this society before the appointed time, it will be seen that we must give some of our time to arranging for this.

Within the past year the practicability of cataphoresis has been rather fully tested, and, while there may not be the enthusiasm that was shown a year ago, it would seem that this method of obtunding hypersensitive dentin has about reached the level that it will maintain. Owing to the care, the time, and the knowledge required for making the operation a success, it will not be used in every case that presents; nor should it be.

The danger to the pulp is a matter not to be overlooked, and this should be the controlling factor in the selection of cases. It seems that if the process is carried far enough to obtund the pulp to any great extent, trouble will follow. It is almost impossible to obtund the dentin in the walls of a deep cavity, for the reason that the current finding a better conductor in the thin layer of half-calcified dentin at the bottom of the cavity, nearly all of it flows directly into the pulp through the bottom of the cavity. The walls of a deep cavity are not usually obtunded by the current, except in a reflex manner by first obtunding the pulp through the thin layer of dentin at the bottom of the cavity. Herein lies the danger. The pulp is already trembling between life and death by the nearness to exposure, and this condition is not helped by the current of electricity which is very likely to be used in such cases, to the extent that electrolysis of the pulp is produced. In cavities where the pulp is somewhat distant, it is entirely feasible to use the current for obtunding the dentin without endangering the pulp. No one should perform the operation without using a milliameter, not any more for measuring the current flowing through the tooth than for the purpose of detecting whether the current may be leaking around the tooth and producing destructive electrolysis of the gum-tissue.

Some five years ago I happened to be in Basel, Switzerland, and saw Dr. DeTrey making gold fillings with a form of gold devised by him. I was astonished at the rapidity with which he was able to build up a large filling.

Of late this gold has been introduced in this country. It appears to possess a property entirely different from any other form of gold now on the market. It is a precipitated gold, and comes in the forms of mats or layers, from one-thirty-second to one-sixteenth of an inch in thickness. Under the instrument it is condensed with wonderful evenness and density, and those who have used Watt's gold can imagine the nature of it by comparing Watt's Crystal gold to a dried-out sponge and the DeTrey gold to a piece of spunk. This gold builds up very rapidly, and is especially fitted for starting fillings, for use in places difficult of access, for building up the body of very large fillings, and for making a dense masticating surface. A form of gold quite similar to the DeTrey gold is that made by Hoff & McFarland, of Frankfurt, Germany. This differs from the DeTrey principally in the thickness of the layers in which it is furnished, and, strange to say, the color of the finished fillings. The DeTrey gold is of a somewhat brassy hue, while the Hoff & McFarland gold is of a darker red.

Both of these forms of gold require special instruments, but the Royce pluggers will answer very well.

This year, as the program shows, a day will be given to clinics. That this is a desirable feature all will agree. An innovation due Dr. Callahan will be tried.

Instead of demonstrating upon a patient, these operations and demonstrations will be made upon models, which can not only be seen by a great many, but can be passed around for a more minute inspection. This enables the operator to point out many things in detail which otherwise could not be seen in a clinic upon a human subject.

At the conclusion of the presidential address it was, upon motion, agreed that the election of officers for the coming year should be made the first order of business at the afternoon session, and the society adjourned to meet at 2 P.M.

### *Afternoon Session.*

The society was called to order at 2 P.M., and proceeded to the election of officers. The following were elected: Grant Molyneaux, Cincinnati, president; L. L. Barber, Toledo, first vice-president; H. F. Harvey, Cleveland, second vice-president; L. P. Bethel, Kent, secretary; C. I. Keeley, Hamilton, treasurer.

Dr. HENRY BARNES, Cleveland, made a short address on the necessity of dental societies keeping more complete records of their members. Such things as the future members would be likely to wish to know should be made a matter of record; for instance, along with the record of every member's name and membership in the society, should be a record of time and place of his birth; of his graduation; other associations, if any, of which he was a member, and official positions he may have held in societies. At the conclusion of his remarks he presented the society with a record book of his own devising, fully prepared for the purpose as he described it.

On motion of Dr. Grant Molyneaux, a vote of thanks was given Dr. Barnes for the presentation of this book, and at a later session the secretary was instructed to employ such additional help as would be needed to collect and record the facts in regard to present and former members of the society, to make the records complete.

Dr. S. D. RUGGLES, Portsmouth, read the following paper:

### THE PREPARATION OF COMPOUND CAVITIES IN ANTERIOR TEETH.

The cavities to which reference is made in this paper are those of the upper incisors, in which the mesio-incisal or disto-incisal angles have either been destroyed, or decay on the approximal surfaces has extended toward the incisal edge, until the enamel is deprived of strength sufficient to withstand the force of mastication. (Fig. 1, A.)

Before entering upon a description of their preparation, it will be well to consider for a moment the points of approximal contact and the occlusion.

In a normal occlusion the incisal edges of the lower incisors may be in contact with the lingual surfaces of the upper incisors anywhere from the incisal edges to a point midway between them and the linguo-gingival ridges, or cingula (Fig. 2, A). In he best-formed arches the interdental spaces extend to points on the approximal surfaces which lie near the incisal edges (Fig. 3, A). The necessity of the preservation of these interdental spaces and points of approximal contact has been urged repeatedly in recent literature, particularly in the writings of Dr. G. V. Black, until detail on this point is unnecessary.

The distribution of force upon the anterior teeth is not the same as upon either the bicuspids or molars. By this is meant that the entire force exerted in the act of biting is not transmitted in a line with the apex, but is distributed to a greater extent along the labial surfaces of the roots in their movements upward and backward, as is seen in Fig. 2; the long axis of the root is not in a direct line with the force exerted. The crown of the typical incisor has an inclination of about ten or twelve degrees from the long axis of the root, and is in line with the force exerted. This fact should be taken as the principle for the preparation of these cavities. In these cavities, as in all other step or compound cavities, the object is, if possible, to have the base of the filling equal as nearly as possible the surface exposed to mastication. As an illustration, let the upper left central incisor whose mesio-incisal angle is destroyed be taken. The dam adjusted and sufficient space in which to work obtained, and all decay removed, it now becomes necessary to determine to what extent the gold must be carried over the incisal edge mesio-distally (Fig. 6, C). This will depend upon the extent of the decay on the lingual surface. The cavity must be extended into healthy tissue, and to such an extent as to insure a sound base for filling. The depth of the step into the labial plate of enamel (Fig. 5, A), or the thickness of the gold for the protection of this plate, will depend upon the occlusion. If it be normal the fortieth of an inch will be sufficient, but in case the occlusion should be end to end with the lower incisors it must be made deeper and the body of gold heavier to withstand the extra stress.

**Fig. 1.**

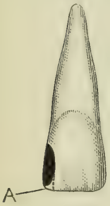


**Fig. 2.**

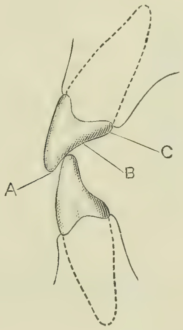
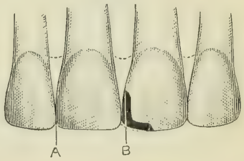


**Fig. 3.**



The first step is made with a square-edged carborundum wheel, one that is fine enough to prevent chipping of the enamel. Care should be exerted to keep the step as nearly parallel as possible with the original or subsequent contour of the incisal edge, as this insures an equal distribution of the stresses; otherwise the body of gold on this surface will only be as strong as its thinnest point (Fig. 6, B).

It is now necessary to remove a portion of the lingual plate of the enamel to form the lingual step (Fig. 5, B). This is done with a drill and chisel, or, better, with a sharp inverted cone in the engine. The extent of this step also depends upon the extent of the decay, but a firm base in healthy dentin is necessary (Fig. 4, D). Its floor is formed at a right angle to a line extending from the incisal edge to the junction of the enamel and cementum on the labial surface, which line is approximately the long axis of the crown; and mesio-distally it should be parallel with the incisal edge (Fig. 5, D).

In preparing this step care should be taken that the labial plate of enamel be not robbed of all its dentin support, else the gold will become visible through this plate. If possible, a slight flat-bottom groove should be made in the dentin at this point for additional retention (Fig. 4, A). All overhanging enamel on the labial and lingual surfaces unsupported by dentin is removed sufficiently to insure self-cleansing margins, and the gingival margin is extended far enough beyond the point of approximal contact to insure its cleanliness (Fig. 3, B). A flat seat is now made in the dentin at the gingival portion of the cavity (Fig. 4, C), at right angles to the axial wall (Fig. 5, C), extended labially and lingually as the case permits, making at the same time undercuts in the dentin, as shown in Fig. 4, B and E.

FIG. 4.

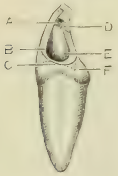


FIG. 5.

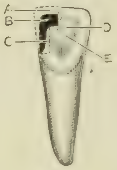
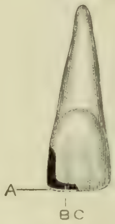


FIG. 6.



A flat-bottom retaining-pit is now made in the labial and lingual extremities of the gingival base, diverging from each other (Fig. 4, F); also one in the lingual step, at the junction of the pulpal and axial walls (Fig. 5, E). All retaining-pits should be made in dentin. In preparing the margins a thin, sharp, flexible chisel should be used, giving them a bevel of fifteen or twenty degrees, care being taken to obliterate all sharp angles, as curves are much more pleasing to the eye.

*Discussion.*

Dr. C. R. BUTLER, Cleveland, said that he had had an opportunity to look over the paper and photographs of the drawings, and was struck with the evident care and study given by the author in the preparation of the paper. All questions have two phases, the ideal and the practical. It is well to have high ideals, for then the results of our efforts are likely to be more satisfactory and complete. Unless an artist has a perfect ideal of what his picture or the piece of sculpture which he is essaying should be, his hand, no matter how cunning and skillful, will never be able to furnish a fine and worthy production.

As dentists we know there are no two cases of just the same arrangement of the teeth, either in form or structure. The ideal treatment of compound cavities in anterior teeth will depend largely upon the state of the remaining teeth. We must remember that the force brought against the filling, if direct, is very liable to dislodge it. The author says the gold must be one-fortieth of an inch in thickness, but even if it were one-tenth or one-eighth of an inch thick the occlusal force of the antagonizing teeth, if acting directly on the filling, will stretch the gold and loosen it. The aggregate force exerted by the jaws in mastication during twenty-four hours will reach over two tons, enough to stretch almost any substance. No matter what anchorage you have, the force will be applied just at the distal corner of the gold. The author mentions the need of different procedure if the teeth are regular or irregular; in irregular teeth undue force is brought to bear upon particular portions of the cutting-edge. Some of the worst cavities we have to repair are in these irregular teeth, where you cannot get at them properly. In his opinion, it is advisable to save as much of the tooth-substance as possible, as the natural edge will not stretch under the force of use as even a heavy gold edge will. It is often better to sacrifice the esthetic appearance to durability.

There can be no successful practice based upon arbitrary rules and formulas, but a rule must be made for each individual case. A high ideal and carefully thought out theory of how to treat the cases in the best manner will, however, be a great help; but each operation will have to be adapted to the necessities of the case, always remembering that strength of the operation and durability are the all-important aims.

Dr. RUGGLES said his drawings had been made from teeth illustrating exactly the course of the work. He felt that he had not spoken sufficiently of the necessity of avoiding approximal contact. It is very important to avoid this in anterior fillings. The force brought to bear in such cases is very liable to produce such a flow of the gold as to cause overhanging margins.

Dr. J. B. BEAUMAN, Columbus, said he had been doing this class of work for forty years. At a convention held at the White Sulphur Springs Dr. Atkinson filled a tooth, using the same method, and that was where he got the idea. In the case of a central tooth, when the cavity does not extend quite to the cutting-edge, the corner of the tooth must be cut away, as the gold filling is stronger than the thin shell of the enamel would be if left to bear the strain.

Dr. RUGGLES, in closing the discussion, said that a few words on the finishing of the filling would be important. There is a natural desire to restore the original outline of the tooth, but it is better to have the lingual surface an inclined plane, because then the food will slide over it and less force will be brought to bear on the filling than if the natural shape of the tooth is restored.

The subject was passed, and Dr. CHARLES A. HAWLEY, Columbus, read the following paper:

## SECONDARY OR STORAGE BATTERIES FOR CATAPHORESIS.

What is a storage battery; how does it act, and what is its especial fitness for cataphoresis? are the questions we wish to consider in this paper; and it is the belief that the better we understand the construction or action of an appliance of any kind, the more intelligent and successful will be our use of it, that prompts the presentation of the subject for discussion here.

The history of the development of the storage battery goes back over a period of nearly forty years. Many attempts to store electricity by means of its action on various substances had previously been made, but Planté, a Frenchman, discovered the secret, the adaptability of lead for the purpose. He immersed two lead plates in dilute sulfuric acid, and connected one to the positive, the other to the negative, pole of a primary battery. A slight chemical change was produced between the plates and the electrolyte, and when they were connected by a wire an electric current was produced. They were then connected in the reverse order and charged and discharged, increasing the current each time, and as the chemical change became greater the discharge of current also increased. This process was continued for several months, with the final result of producing a "cell" which, when charged, had a thick coating of lead dioxid on the positive plate and a spongy lead on the negative; but when discharged had a coating of lead sulfate on both. During the discharge a very powerful current was produced, sufficient to melt iron rods. Though in the present improved storage batteries the style of cell and the process of forming are much changed, the principle is the same,—*i.e.*, the electricity is stored or accumulated in the form of an unstable chemical compound. The peculiar and valuable property of this compound is that its chemical energy can at any time be reconverted into electrical energy by connecting the two plates.

The current produced in the complete discharge is practically equal to that used in producing the chemical change in storing. In winding a clock we store the energy of motion by the tension of a steel spring; in the storage cell we might compare the action of the chemical compound to the tension of the clock spring, and electricity with the energy of motion, or the muscular power. This action is entirely different from that of a primary battery. In the primary battery the chemical disintegration of one of the plates by the action of the fluid produces the current, but this process can never be reversed.

A number of changes have been made in the form of storage batteries, leading up to the greatly improved and nearly perfect ones in use now. When the exact nature of the chemical compound on the plates was found, it was but a step to coat lead plates with lead oxid and sulfuric acid, which, by a few days' charging, could be changed to lead dioxid on the positive and spongy lead on the negative plate, thus saving the months of time in forming. Plates have also been made in the form of grids, with the active material, in the condition of paste, placed in the holes. The trouble with this form of plate has been found to be in the bending or buckling during discharge, which is caused by the great expansion of the paste. The paste is also apt to scale off the plates or fall out of the grids, and accumulating at the bottom, short-circuit the cell. Batteries are now on the market which claim to overcome completely these objections.

The especial fitness of storage batteries for cataphoresis lies in their constant and steady voltage during discharge, which is due to several causes: First, the internal resistance of the cell is very low, owing to the small space necessary between the plates. With perhaps a few exceptions, the internal resistance of primary batteries is very high, and interferes largely with their efficiency. Second, there is no such thing as polarization of a storage cell. Polarization unfits most primary cells for closed circuit work, or for holding a steady current for any length of time. The attempt to overcome it has led more than anything else to the great number and variety of cells on the market, and the number in itself is an evidence of failure. In comparison with the Edison direct current, the storage battery presents several advantages which we will mention briefly: First, freedom from the influence of induction currents along the line, or other causes which produce variation of voltage. Second, absence of danger during storms, accidents at power station, or ground connection by way of the fountain spittoon. Third, it obviates the trouble of reducing the unnecessarily high voltage of the Edison current with a controller.

The character and rate of discharge of a storage differs considerably from that of a primary battery, in that a very much larger volume of current can be obtained by decreasing the resistance in the external circuit. The capacity of a storage battery is measured in ampere hours, or the number of hours the battery will, when fully charged, discharge one ampere current before becoming exhausted. But the discharge can be completely controlled by varying the resistance in the external circuit. For example, a ten-ampere battery will discharge one ampere for ten hours, or, reducing the external resistance, ten amperes for one hour, or, reducing still further, twenty amperes for one-half hour, forty amperes for one-fourth hour, etc. If used with very great external resistance, as in cataphoresis, it would discharge a current of say five milliamperes for two thousand hours. At this rate, if used one hour a day every day in the year, a ten-ampere battery would last between five and six years before becoming exhausted. No such amount of current can be obtained from a primary battery of equal voltage. We might here again compare the storage battery in its discharge to the action of a clock spring, which, when wound, can be released at once by a sudden spring or by a steady motion for a long time. The batteries can be charged from almost any source of current, provided the voltage is at least ten per cent. higher than that of the battery, as otherwise the action would be reversed. The use of a battery for five or six years without charging would probably not be practical, as manufacturers claim that to keep them in best condition current should be added much oftener.

In practical results in cataphoresis, I have found that the storage battery carries out all that would be expected of it from theoretical consideration. After using the dry-cell battery and Edison direct current with various shunt controllers, I have had much better success with the storage battery with a series controller. The application is smooth and painless, and the pain limit can be very closely followed in increasing the current without signs of fluctuation. In other words, my experience seems to indicate that in cataphoresis the source of the current is as important a factor as the form of controller.

### *Discussion.*

Dr. Wm. H. Hersh, Piqua. He was opposed to the use of the storage battery for many reasons. The storage cell made up of lead plates immersed in sulfuric acid is not capable of originating any current in itself, but gives off current which it receives from some outside source. If it is left idle for any considerable time, it will become sulfated and its strength will be lost. It must be used nearly constantly to give the best results, and the best cells only give out ninety per cent. of the current which has been put into them. Most cells will not give higher than from fifty to sixty per cent. The constancy in voltage is no better than the sal-ammoniac cells, and bichromatic cells, or dry cells, are just as regular. The only case in which the storage battery is to be preferred is when you are using a shunt instrument of low voltage. His experience had taught him that storage cells were very dirty, and objectionable on this account. When compared with the 110-volt current, the storage cell is superior; but there is no occasion to use the 110-volt current, nor should a battery of high capacity be used when all that is needed is from two to five amperes.

Dr. W. A. Price, Cleveland, commended the paper highly, but was disappointed that it did not go into detail more thoroughly as to the bulk and price of the batteries and expense of maintaining them. For cataphoric uses the cell should be of very low amperage. If we had a cell, such as one firm had tried to get up, of one ampere it would be very satisfactory, but it is questionable whether we would get a more uniform current than from a primary cell. He had used dry cells for a year; these only cost twenty-five cents each, and seemed as good at the end of the year as at the beginning. He thought the ideal apparatus for furnishing current for cataphoric purposes was a little water-power dynamo which would run by the power of water from the spigot, and utilize these for charging storage batteries, using small batteries and charging them frequently. A fifty-ampere hour storage battery would cost fourteen dollars each, while the dry cells cost only twenty-five cents each. They should be used in series, and so arranged as to get a very gradual increase. He asked how much current those present used.

Dr. L. E. Custer said he used about three-tenths of an ampere.

Dr. Price said there was no milliamperemeter made that gave us small enough graduations, nor is there a good controller in the market for cataphoresis.

Dr. W. H. Todd, Columbus, asked if a milliameter could be made to register low enough to work in series, so that it would not affect the cataphoric operations.

Dr. Custer said it would not affect it at all; you would add more voltage.

Dr. Price said the lower the sensitiveness the less would be the resistance, and the less the resistance the more sensitive would be the instrument.

Dr. Hersh said he used as a maximum current from two to five milliamperes. He does not mean this on teeth that are alive, but for relief of sensitive dentin. His milliameter will register about the same as others. He had constructed one whose needle moved about seven inches for one milliampere, but he found that it was sensitive to outside influences, and has been told that all such would of necessity be so.

Dr. Hawley said that a dry-cell battery when new was efficient, but when about half used up there would be much fluctuation in the current. If there were no fluctuation in the current there would be no necessity for shunt controllers. He believed that a storage battery could be maintained in good condition with the use a dentist would give it in his work, and they are not expensive. He spoke of the Willard concentric cell battery, which he said cost fifteen dollars, and it was not dirty. The controller is a series controller, and it will not give success with dry cells. The Edison current will show fluctuation of voltage. In one test which he made, a Mescot dry cell lost in thirty minutes about thirty per cent. of its strength, while a storage battery began with two and one-tenth and left off with one and ninety-seven-hundredths.

The subject was passed, and the society adjourned till next day at 9.30 A.M.

## SECOND DAY—*Morning Session.*

Dr. W. T. McLean, Cincinnati, read the following paper:

## A METHOD OF TREATMENT TO PROMOTE THE UTILITY OF PULPLESS TEETH.

This is one of the various important pathological conditions in which every dentist is more or less interested, owing no doubt to the fact that there are so many necrotic pulps found in the mouths of patients who present themselves to dentists for relief and treatment. It is a pleasure for me upon this occasion to present to the members of this society a method of treatment which has been productive of satisfactory results in my practice. It is well understood that the tooth receives its principal nourishment from the pulp, and if it were not necessary for its preservation there no doubt would have been a natural factor to eliminate it. It is known that after the age of twenty-five there is an improved calcific change occurring in the structure of the tooth, and this improvement is greatly lessened when the pulp is destroyed. Owing to the fact that there is organic and inorganic matter which enter into the formation and substance of a tooth, they are equally essential for its maintenance. I divide pulpless teeth into two major classes,—

viz, the medico-surgical and the septo-carious. The first class are those where the pulp is found exposed, vital or partially so, and the second class are those where the pulp has become devitalized by septic and carious encroachment. In the first class the treatment is not complicated and the prognosis is good. In the second class there is invariably a septic condition present at the apices of the roots and frequently a necrotic condition of the pericementum, and possibly a disintegration of the alveolar process, the result of necrosis. In this class the prognosis is only fair. I never attempt to treat a pulpless tooth upon which I cannot apply the rubber-dam; to my mind this is imperative; after its accomplishment I obtain direct access to the cavity and canals of the tooth to be treated, never fearing the sacrifice of enamel and dentin sufficiently to that end. In the first class the removal of the vital pulp is painlessly accomplished by the chlorid of ethyl spray (Bengue), which is supplied by Leeming & Co., New York. This spray requires about ten minutes' time; after the removal of the pulp, which is done with a stiff barbed broach, the tooth is permitted to return to its previous condition; after which the thorough cleansing and dehydration of the dentin surrounding the canal is accomplished. The canal is well wiped with Ceylon oil of cinnamon and hot air blown into it for a few minutes; the heat vaporizes the medicament and causes it to permeate the dentin slightly, and renders the canals and apical space sufficiently aseptic to prevent sepsis. The canals are now filled with powdered asbestos made into a thin paste with a fifty per cent. solution of silver nitrate; this paste is pumped into the canals by using a plain broach upon which are wrapped a few fibers of cotton, and completely filled. Harvard cement is used to protect the contents of canals. The tooth thus treated is given forty-eight to ninety-six hours to become accustomed to its changed condition, after which filling, crowning, or preparation for bridge abutment may be accomplished with propriety.

In the second class the operative precedure differs, inasmuch as complete asepsis is more difficult to obtain, and a correct diagnosis cannot be made, as the degree of the pathological condition cannot with exactness be ascertained. We find in this variety foreign matter, pus, and possibly necrosis of the alveolus. The treatment is as follows: The rubber-dam is applied, the cavity and canals are opened, free access is obtained with aseptic instruments, and hot water is injected into canals by a hypodermic syringe until all loosened *débris* is removed. Next pyrozone is injected; if pus be present it will be forced out; a few injections will suffice. Bibulous paper placed conveniently will catch and absorb the overflow of medicament, and prevent soiling of the patient's clothing. The canal is next dehydrated with Evans's root-drier, and cotton saturated with oil of cinnamon loosely placed and retained in place with gutta-percha stopping. The patient is dismissed with instructions to return in forty-eight hours. The treatment is continued for three or four sittings, depending upon the severity of the case and the recuperative power of the patient, allowing the same length of time between each treatment. When a fistulous opening is present and the exudation of pus is noticeable, I bur through this opening and endeavor to reach the apical space and inject pyrozone through the canals and have it traverse the fistulous tract. The object is to mechanically and aseptically cleanse it. I next partially dry this tract, and with the hypodermic syringe inject oil of cinnamon so that it oozes from the gum-opening. This is continued until pus formation, fetid odor, and sensitiveness are eradicated. The completion is the same as the first class, using my judgment in performing the most desirable permanent operation.

Dr. J. TAFT, Cincinnati, said the subject of the paper was an important one, because exposure of pulps and the death of pulps are so frequent that it is desirable that all dentists should have a clear knowledge of the best way to treat the cases when they are found in practice. No one has practiced long without meeting many cases of pulpless teeth, and those having exposed but still living pulps. Proper treatment will often result in a prolonged retention of pulpless teeth, making them serviceable organs. There is a great variety of treatment both of pulpless teeth and those having exposed pulps. The paper gives the impression that all exposed pulps should be destroyed, but he thought the retention of the pulp, when at all possible, was very important, as the dentin is living matter and its continued life depends upon the preservation of the pulp. When this is destroyed the dentin becomes a dead tissue. The paper is so worded as to leave us to understand that when the pulp is dead the nutrition of the tooth is diminished, but in a great proportion of cases the nutrition of the dentin is absolutely cut off on the death of the pulp.

In the great majority of cases, when the pulp is recently exposed and only by a small orifice, its vitality can be preserved. Many think that every exposed pulp should be destroyed. The feeling is that to take it away makes an end of the trouble, but does it end it? Is it not true that pericementitis and alveolar abscess will often follow destruction of the pulp?

When the pulp must be destroyed, the course recommended by the paper is much better than to poison the pulp by the use of arsenious acid. This is often the cause of trouble afterward; sometimes the trouble follows quickly, sometimes it appears long afterward. This can be demonstrated by any one who carefully notes the results. There are many ways of removing pulps without pain: by the use of cocain, for instance, in crystals or in solutions applied to the pulp; or it may be injected into the pulp, which may then be removed. Cataphoresis also will anesthetize it in almost every case, so that the pulp may be removed with as little pain as you would remove a shred of gum-tissue from the margin of the gum. While the dentists have these agents at their command, it is almost, if not quite, criminal for them to use so dangerous a method as poisoning it with arsenious acid.

The paper did not make any reference to the variety of conditions found in pulpless teeth. Sometimes the pulp is found to have been mummified by natural processes; there is no odor, nothing left but merely the skeleton of the pulp. Other times the pulp is in a more or less decomposed condition; or it may be without odor, but still be an active irritant on the tissues beyond the apex of the root. More frequently the state of the tooth is one of very foul odor, and the tissues beyond are suffering acutely. If a pulp is mummified and dried up it may be removed with scarcely any antiseptic treatment, but measures to make the canal aseptic become necessary when there is any odor of decomposition. In some cases the pulp may be very offensive and still make no impress on the tissues beyond; sometimes because the apex is so closed that there is no communication, or it may be that the system is so vigorously healthy that the effect is overcome by Nature's methods of disposing of irritants. The latter cases are very favorable, as when the pulp is removed you need dread no after-effects. In many cases probably antiseptic treatment is not necessary, but still it is always advisable. Of the vast variety of antiseptics employed, most are efficient. Sulfuric acid is good; silver nitrate is also efficient, but some others are just as good and will not discolor the tooth as silver nitrate will. Mixing with asbestos is a new idea, though the advantage of it is not quite clear, except that the asbestos is indestructible. Silk or flax would answer as well. Fully saturated with silver nitrate, they would not undergo any change in the tooth-canal.

The subject was passed.

(To be continued.)

## FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

The First District Dental Society of the State of New York resumed its regular monthly meetings on Tuesday evening, October 12, 1897, at the New York Academy of Medicine, No. 17 West Forty-third street; the president, Dr. Alfred R. Starr, in the chair.

After the transaction of preliminary business the president introduced Dr. George W. Weld, of New York, who read the paper of the evening, entitled "Filling Root-Canals by the Aid of Diagrams and Chemical Means," illustrating with lantern slides and chemical experiments.*

### *Discussion.*

Dr. Chas. Frederick Ash. In following the method of Dr. Weld for filling root-canals, principally very delicate and tortuous canals, I find that in placing a fine broach into the canal, using a drop of acid, I cannot draw the broach up more than once or twice before it is almost consumed by the acid. To obviate this I have tried another method,—using a different metal to carry the acid as a disinfectant, and afterward introducing the metal points, and have found that the action has not been so severe on the other metal. I have not been able to disinfect fine canals by a fine broach and the application of a drop of acid; if the doctor has, I would be glad to hear of it.

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* As Dr. Weld's paper was substantially a repetition of what he has previously published in the Dental Cosmos in explanation of his chemico-metallic method of filling root-canals, we deem it unnecessary to print it in full.—Ed. Dental Cosmos.

Dr. W. D. Tenison. About two years ago I accepted an invitation from Dr. Weld to attend a clinic where he demonstrated his method of filling root-canals with his points. I wanted to find out a method (as we are all trying to do) for the purpose of making the results of my operations as complete as possible. I saw him fill an upper molar that was very sensitive. He said at the time that it did not make any difference even if there was an inflammatory condition there; that he would fill the tooth at the next sitting, when the tooth would be completely relieved of the inflammatory condition that existed. After receiving explanations from Dr. Weld as to the action of the acid on the metal, forming an oxid of zinc, I became very much interested, from the fact that over thirty years ago I accidentally discovered that the use of zinc chlorid introduced into the canals seemed to disinfect them,—just how I was unaware at that time; but I have since learned that it was and is a very good germicide. After Dr. Weld's explanation in regard to the manner of operating, and seeing him operate, and knowing the action of the acids on the points, I got a number of them and gave up the treatment I had been following for so many years, and since have been simply using Dr. Weld's points, so far with very satisfactory results. I am speaking now of facts, without going into any scientific matter. Dr. Weld said that upon putting the points into a glass containing that acid, they entirely disappeared in a few seconds. Is that the case when the root is filled with those points?

Dr. Weld. It is not.

Dr. Tenison. The point I wish to make is this: When I have disinfected the roots of a tooth with zinc chlorid I had to resort, after that, to the filling of the canals with gutta-percha. With Dr. Weld's points two things are accomplished: The action of the point when brought in contact with the acid produces an oxid of zinc, and the pulp-canals, as Dr. Weld says, are filled and disinfected at the same time. After filling the roots according to his method, I fill the tooth with gutta-percha and leave it for a probationary period of a week or so. I can only make a satisfactory report in regard to it up to the present time.

Dr. Nelson T. Shields. I have been filling roots for a great many years, and I think entrance into small canals is rendered very easy if the operator has a little patience and will use Donaldson's pulp-canal cleanser, No. 5. I have demonstrated this publicly,—doubtless before all present. We can reach the small canals so readily that the use of nitro-hydrochloric acid is not necessary. In conjunction with the No. 5 Donaldson pulp-canal cleanser, you use a twenty-five per cent. solution of pyrozone, which is highly antiseptic. You can take a tooth that has never been opened,—one of those cases we have all had,—where the least carelessness will produce a most violent abscess, and with a little gentleness and the judicious use of the Donaldson cleanser you can produce such a healthy condition of that tooth that in my experience, nine times out of ten, the tooth will be ready for treatment at the subsequent sitting. With such a remedy as the twenty-five per cent. solution of pyrozone, which we all know is not destructive of living tissue, particularly the hard tissues of the body, like the teeth, I think the substitution of such a method as Dr. Weld's is altogether out of order.

The diagrams shown would be very interesting to students, and they would probably learn a great deal from them; but for people with the experience of many years,—for such operators as we expect to find in this society,—I think they might be eliminated from the paper.

Dr. L. Ashley Faught, Philadelphia. I came over with the express purpose of looking in on the society, and because I felt sure that I would hear something in the way of an instructive paper from Dr. Weld. I am delighted with what I have heard, but am hardly prepared to speak on the use of that acid. I am using sulfuric acid, and am a great believer in it. When Dr. Callahan promulgated that method of treating root-canals we took a great jump forward. If this method is as satisfactory, we are indebted to the gentleman who has brought it before us. I am not prepared to say anything on the subject, because I have not tried it in any way.

Dr. W. W. Walker. Even if we have all been practicing dentistry for a number of years, as Dr. Shields says, we ought to be very grateful to any person who will show us diagrams or do anything to assist us in locating these little pulp-canals that are so much talked about. For my part, I am obliged to Dr. Weld.

Dr. Louis C. LeRoy. Is there any neutralizing agent for the acid, in case we desired to use it as sterilizing or antiseptic, and follow it up by some other method of treatment?

Dr. C. G. Pease. Dr. Weld claims that the root is thoroughly sterilized, even though the point does not go through the foramen. Is he sure that he always gets the points there,—that he does not go beyond, because of the destructive nature of the acid?

Dr. John I. Hart. I would like to know whether or not Dr. Weld advocates this method of root-filling in the event of any periosteal irritation?

Dr. Shields. I have had the opportunity once or twice at clinics of examining pulp-canals after they were supposed to have been burnt out by potassium-sodium, and found pieces of the pulp forced up into the apex of the canal, which I removed mechanically. I would like to ask if Dr. Weld, upon examination, ever found any remnant of the pulp at the apex of the root after his chemical treatment?

Dr. Weld. It is possible that the acid may destroy the point in some cases before the root is thoroughly sterilized, and it is possible that some other metals may be used to sterilize the root-canals. Where the root-canals are large, and a barbed broach can be introduced, or one of these little sensitized points with cotton at the end, you can sterilize thoroughly clear to the apex, and do it very quickly. Where the canal is extremely small and tortuous, the oxid or coating which is formed upon the metal is thought to be sufficient to sterilize the root-canals. In fact, opinions have been expressed,—by one chemist at least,—that if one of these little points be dipped into the acid and then inserted into the root-canal, the chlorid or coating which is formed upon the point will be sufficient to disinfect and change the character of the small quantity of animal matter which is left in those attenuated, tortuous canals. If the points are dissolved, it is because there is a surplus of acid; only a drop of the acid is carried to the pulp-canal and pressed against the metallic point, so that there is very little danger of dissolving it. In fact, they are not dissolved, but only a coating formed around them.

As far as the composition of the metal is concerned, I have now about sixteen different formulæ. The first formula was ninety per cent. zinc, six per cent. tin, and four per cent. silver. I have reduced it now to ninety-eight per cent. zinc; the other metals which are incorporated with the zinc are only for the purpose of giving the proper stiffness to penetrate into the small canals, tin and zinc alone being not much better than gutta-percha points. The acid is nitro-hydrochloric acid. I call it "dental" to distinguish it from the nitro-hydrochloric acid which is described in the Pharmacopœia. That, I believe, has a less quantity of nitric acid.

A Member. What is the difference between regular nitro-hydrochloric acid and the dental acid?

Dr. Weld. The dental acid contains an excess of nitric acid, and it also contains a gum resinous matter, which modifies its action to some extent.

So far as neutralizing agents are concerned, perhaps alkalies of some kind would be good. I never used them, because I do not think it is necessary. There is very little, if any, tooth-substance destroyed. The metal itself will act as a neutralizing agent, because the energy of the acid is first directed to the metal, and that being the case, its energy is wasted upon the metal.

The point, to be effective, must go to the foramen. I do not see how a root-canal can be sterilized beyond the influence of the point. There is not much danger of pushing a metallic point through the foramen. The great trouble hitherto has been that we have been unable to fill the delicate canals with any kind of filling-material.

With regard to immediate root-filling, I do not think that, as a rule, it is a good plan to do so in all cases. When a patient presents himself with a tooth in which there is putrescent matter in the canal, I generally open into the pulp of the canal and give it vent. I very seldom do anything further the first day. I think the introduction of steel instruments into pulp-canals of such teeth is very apt to add a burden to the already affected periosteum, and is liable to be followed by increased inflammation. I think it is better, in such cases, to wait one day before filling. I use a slight cotton dressing, and as a rule, though it may not be invariably so, I find that when the patient returns the following day the inflammation has subsided to a great extent.

As to the diagrams, I wrote to Philadelphia some time ago, asking one of their dentists—a prominent man, who is supposed to be familiar with dental literature—if he had ever heard of any such thing as filling root-canals by the aid of diagrams, and if so, to direct my attention to the subject. I thought of giving a lecture to the students of the New York Dental College, and I did not care to go before the class and find I was talking about something that was old. He wrote me that he had never heard of such a thing, and, as far as he knew, there was nothing published in relation to the subject.

Dr. NASH. In Dr. S. G. Perry's paper (*International Dental Journal*, September, 1895) he directed attention to the access of root-canals of different teeth. I do not know that he elaborated so far as to show diagrams, but it was quite a lengthy paper on that subject.

The PRESIDENT. You will find some of those diagrams in the "American System of Dentistry." They are in vol. i, p. 511. I had some copied for my lectures.

Dr. WELD. I wrote to the editor of the "American System of Dentistry." He said he knew nothing about the application of diagrams to aid the student. It may be somewhat of a kindergarten plan, and in view of Dr. Shields's remarks I apologize to the society for bringing it before them. I do not profess to be as familiar with dental literature as some others I could mention, but, as I stated, I made inquiries about it. Certain dentists, while they profess to believe in progress, at the same time are opposed to every innovation, and of course to every new method. This system of filling teeth was first designed for the delicate root-canals into which it is impossible to introduce barbed broaches. Either one of these Donaldson broaches (showing instruments) which I have here can be easily inserted into the upper centrals and laterals and the larger canals of molars; but I maintain that there is a class of delicate tortuous canals into which it is impossible to introduce anything except the *finest* and *smoothest* of steel broaches. I maintain that there are hundreds of teeth into the canals of which you can introduce these fine, smooth broaches, but not the barbed ones.

Pyrozone may be well and good for some purposes, but I do not see how it is possible to get it into the tortuous canals so as to disinfect them. I may not be as skillful as Dr. Shields, but I have never been able to do it.

On motion, the society extended to Dr. Weld a vote of thanks.

The society also took action to establish in the New York Academy of Medicine "The A. L. Northrop, D.D.S., Dental Library Fund." (See DENTAL COSMOS, November, 1897.)

Adjourned.

B. C. NASH, *Secretary.*

# NORTHEASTERN DENTAL ASSOCIATION.

(Continued from page 53.)

## FIRST DAY—*Afternoon Session* (Continued).

DR. C. P. WEBSTER, Franklin Falls, N. H., read the following paper:

### ONE CAUSE OF DENTAL DEGENERACY: THE PHYSICAL RELATION OF FOOD TO THE TEETH.

That some believe the dental organs of man—the teeth and their associate parts—are to-day surely inferior to those of our ancestors is evidenced by our literature. One number of the *International Dental Journal,* early this year, contained a reprint of that interesting essay on "The Degenerate Jaws and Teeth," by Dr. Eugene Talbot. "British Teeth on the Down-Grade" is the title of a series of papers by Dr. Charles Fox, recently published in the *British Journal of Dental Science.* At the meeting of this society in Worcester, two years ago, Dr. D. M. Clapp is reported as saying, "Children's teeth are not nearly so good as they were some years ago."

Perhaps among no other people are dental lesions greater than with the English-speaking race, though most likely the wealthier classes of other nations, closely following in like prosperity, are similarly unfortunate; but of the peasantry of Europe there seems good ground for the opinion that they possess better teeth than the poorer people of America. A frugal life, bread from coarse flour, and a simple diet are believed to be contributing factors to their improved condition.

Dr. J. M. Whitney's observations "Among the Ancient Hawaiians," as stated in a paper under this title and read before the World's Columbian Dental Congress in Chicago, is of interest in this connection. A people with simple habits, few wants; believed to have existed for thirteen centuries, without known influence from other nations until about one hundred years ago; among whom are found favorable conditions for examining the crania of the ancient dead. He says, "The relation of food and disease to the health of the dental organs is strongly brought out as we study the changes shown in the teeth of those buried in the oldest caves, and so on down." Of the teeth of their children to-day, he finds them "but little better than those of their white school-fellows." Dr. Whitney's exceptional opportunity for becoming acquainted with the crania of the ancient people of these islands led him to conclude that of the early inhabitants about twenty-five per cent. had been free from caries, dental irregularity, or disease.

Miss Alice C. Fletcher, an excellent authority on the lives and customs of many tribes of our North American Indians,—a woman who has for a period of years at a time lived among them, as nearly as possible like one of their own number,—has recently returned from a sojourn among the Omahas. In response to a personal letter of inquiry I was given the following: "The teeth of the Indians appear better than ours, though perhaps not better than those of the peasantry of Europe. The dental organs of the older full-blood Indians were decidedly better than the half-breeds, and better than their children's. The teeth of these older Indians were much worn, often nearly to the gums, yet the small portion remaining seemed sound. This unusual wear is accounted for by the grit, which was unavoidable, their maize, seeds, and roots being, in older times, crushed between stones. In recent years the food of the Indians has entirely changed over the whole country, and the staple articles of diet to-day are pork, poor beef, and white flour raised with baking-powder. They have a saying that 'A man should not continually cut his meat with a knife, for it will cause loss of his teeth.' "

This observer's experience, extending over twenty years, has taken her not only among many tribes in our states and territories, but also among many natives of the North Pacific coast as far as the Aleutian Islands. Her high standing in scientific circles, and the careful answers given my inquiries, attest their reliability.

The foregoing are fair illustrations of the progress of nations toward education, refinement, and the higher development; but, alas for the teeth! it would seem as though dental infirmities are greater where civilization is most advanced; where material prosperity abounds, giving luxury, ease, and convenience, there are found evidences of degeneracy.

For a moment step aside to a subdivision in the animal kingdom below man. If we estimate the teeth of wild animals from specimens taken, it appears that they are practically, though not entirely, exempt from dental disorders, excepting the infirmities of age; at least, they appear much more exempt than animals domesticated, where abnormal or modified conditions of diet and life are introduced by man. Many interesting facts could be gathered from this source.

Dental caries is by no means uncommon in the horse, the most highly bred of all animals. Of dogs, one practitioner of veterinary medicine in Philadelphia writes that he has observed several cases where dogs kept upon soft diet lost their teeth. No work being required, they loosen and drop out of the cavities that hold them. The same thing has been said of cows long fed in the stable upon mush and swill, and deprived of natural food.

Exercise or work is a prime requisite for health. The normal use of a part is conducive to its perfection; or, contrariwise, disuse means loss, and the failure to exact of an organ its proper function must result in the weakening of that organ. This could be illustrated in many ways.

Nature responds to all reasonable demands upon a part, and endeavors to fit that part for that which is required of it. Now, let a particular demand be made continually upon an organ, or its natural function continually slighted, and let the response of nature to either of these conditions be multiplied through many successive generations, and shall we not expect results widely different in the two courses outlined?

Turning to our subject, picture the healthy mouth, with ideal teeth and gums, each in perfect health,—how finely adapted for their work! As men are living to-day, do these organs get this work in a normal degree? I hold they do not; that among other well-known and pronounced causes of dental degeneration this lack of work is worthy of more recognition. It is not sufficiently brought to the attention of the people. Very little of our food requires vigorous or even moderate use of our dental organs; and, beside this, the habits of many lead them to slight the function of the mouth.

Another important gain resulting from the use of diet requiring more mastication, would be improvement in the condition of the gums and the lessening of calcareous deposits. Dr. E. M. Keltig, of Louisville, in a paper on "The Gums," read in June, 1896, said, "The prevalence to-day of all kinds of soft and pasty foods has much to do, through lack of friction, with causing bleeding gums. In days gone by, when hard food and coarse bread were used, the gums were mechanically stimulated."

The point I have desired to emphasize is that the dental organs *need* vigorous, active use; that they are designed for such a service, and such a service is a condition contributing to their health.

There was no discussion of Dr. Webster's paper, and Dr. J. A. Pearson, of Barton, Vt., read the following paper:

## What Shall We Do?

What can be done to educate the people to a better knowledge and value of their natural teeth, as well as a proper appreciation of the efforts of a conscientious dentist to save them? Comparatively few people understand the value of the teeth, and their proper use and care as a necessity to good health. Until they do, we cannot expect them to be particular about caring for them or in selecting their dentist. I do not refer to the ignorant, or to those so unfortunate that they cannot employ a dentist. There are many people who are well informed on general subjects, individuals who read the current literature of the day, who seem to be ignorant as regards anything pertaining to the teeth, excepting as they have chanced to employ a dentist to extract a tooth, or have read in the daily papers the glowing advertisements of "Teeth extracted without pain," or "Teeth inserted without plates for one dollar," etc.

It is impossible for the busy dentist, and more so for one not busy (as he does not see many people), to educate the public. Who is to educate them if not the dentist? Yet I have heard dentists say that they were not trying to educate their patients or the people, as it was too slow work for them.

We seldom see anything in the current literature of the day regarding dentistry, but we do see a great deal written on hygiene, physical culture, and the proper food to be taken. I believe that it is of equal importance for the people to know and understand that the teeth were put in their mouths for a purpose, and that they cannot lose them without permanent injury to themselves and their offspring.

If the publishers of our numerous family magazines and daily papers could be induced to publish short articles on the subject, articles written by some of the contributors to our dental journals, explaining the uses and abuses of the teeth and the difficulties under which the dentist often labors, it would be mutually beneficial. Such articles would be read and appreciated, and would be of more benefit to the people than much that is published. There are many who believe more readily what they read than what is told them. The advertising dentist brings himself directly before the people through these journals, and he does it many times to the detriment of the professional dentist, because the people do not understand what they need.

Let the people be informed through these journals that it is not professional to advertise; that all that glitters may be gold, but that nature never put a gold crown in the human mouth. Let the people once understand that nothing is truly artistic in the mouth that does not resemble nature, and some of their golden advertisements would cease to appear. I do not refer to cases where it is sometimes necessary to do what we would rather not. We have all seen many cases where gold crowns were apparently put on for the money in it, regardless of the disfigurement of the features and the mutilation of teeth.

Many of the articles in the dental journals would be interesting reading for the people, and they would read them if the opportunity were afforded. Public opinion as formed through the press has a far-reaching influence.

I imagine some of us would have to change our habits somewhat, did our patients and others read even the articles relating to the sterilizing of our instruments to be found in our dental journals. The pen, when properly wielded, should become mightier than the forceps.

Dr. GEORGE F. HARWOOD, Worcester, Mass., then read the following paper:

## METHODS IN CROWN- AND BRIDGE-WORK.

Permit me to call your attention as carefully as I may, in the five minutes allotted to me, to a few instruments which I have found useful in the construction and repair of crown- and bridgework. The removal of a gold crown which serves as an abutment for a fixed bridge which comes to us for repair on account of disrupted joints or broken facings, may be, with the instruments commonly at hand, a difficult and tedious operation.

By the aid of a pair of crown-slitters this may be easily and quickly accomplished. The long, concave beak of the instrument being placed on the cusp of the crown to be removed, the cutting blade is pressed against the cervical edge, and just enough force is applied to slit the band nearly to the point where it turns to meet the cusps. As the slitting blade forces its way through, the band is wedged apart and the cement attachment broken up. A slight pull with a retractor or hoe-shaped excavator placed against the cervical edge of the band, on the side opposite the slit, will suffice to accomplish its removal.

A broken Richmond crown may be removed by grinding the solder on the lingual surface down to the point where the pin passes through the disk; concave the gold slightly at this point, when a Hern's trephine, placed in the dental engine and rotated around the pin, will cut through the disk, and may be extended into the root a short distance. This severs the union between the disk and post, which latter may be removed by a slight twisting and retracting force applied to the post by a Hern's broken-pivot extractor. A short section of gold or platinum tubing may then be fitted to the post, passing through the disk, around the post, and into the enlarged opening in the root. The relation of post, tubing, and disk with the new facing may be secured with fluxed wax and the parts invested and soldered, making the fixture and anchorage even stronger than the original.

A broken facing may be replaced by drilling through the backing for the pins of the new facing, cutting out the gold between, countersinking the backing on the palatal surface, forcing the pins apart and into the countersink by a pair of curved pliers, one jaw of which is fitted with a swiveled socket to receive a pellet of lead or shot to protect the facing, the other having a grooved and swiveled socket, wedge-shaped, to force the pins apart and into the countersink, while that part between the pins mav be filled with a fine alloy from which the excess of mercury has been carefully expressed.

Combination pliers for bending and contouring gold bands and perforating backings are shown, with others for contouring, expanding, and contracting. Another pair is provided with a die for making a taper thread on crown-posts or anchor-screws; also a pair of root-nippers to assist in removing from a lower cuspid a refractory open-face crown of platinous gold, which served as an anterior abutment for a bridge. By applying one beak to the lower edge of the crown and the other to the top of the tooth just in front of the cusp, slight pressure in closing the handles served to remove, unmarred, a crown and bridge which a brother dentist in the West had said he could not do without mutilating, if not destroying, the crown.

I have here a simple retractor, having two points of contact, which serves as a handy assistant in holding ligature or dam beyond cervical, labial, and buccal cavities. It also assists in holding a gold band in place while marking or adjusting it on the tooth.

Sweeney's root-trimmer, used skillfully, will save lots of hard work in preparing roots for bands and crowns. The fissure-bur shown in connection with this instrument was made from a broken bur, and is far superior in cutting properties to the ordinary dentate fissure-bur now on the market.

(To be continued.)

## SOUTHERN DENTAL ASSOCIATION.

(Continued from page 66.)

### SECOND DAY—*Afternoon Session* (Continued).

*Continuation of discussion on pyorrhea.*

DR. J. S. MARSHALL. There is one thing to be taken into consideration in considering the etiology of pyorrhea alveolaris that has not been mentioned, and that is senile changes. I think that in most of our cases we will find that the patients are past middle life. Dr. C. N. Peirce is here, and he is familiar with my views on the subject. If we go back to histology and study the development of the teeth and hair, we find that they are closely allied dermal appendages or tissues. We find many bald-headed men and some bald-headed women, but not until they have passed middle life; it is apparently a senile change in the bulbs of the hair; so, also, as the majority of cases of pyorrhea occur late in life, it may be the result of senile changes affecting the membrane around the roots of the teeth. The teeth drop out as the hair falls out. I do not claim this as the cause, but I believe it is one of the causative factors in this disease,—the result of senile changes.

DR. FRIEDRICHS. Are there any two members of the dental profession who coincide in their views on this subject?

DR. MARSHALL. We are all working to the same end. We are trying to find out about it. If I can add a little to the general store of information on the subject I am satisfied.

DR. FRIEDRICHS. I will cite one case, a gentleman under forty years of age; the upper cuspid was affected. The gum had a bluish tinge; pressing the finger upon the gums would squeeze out a drop of greenish pus; all around the socket was involved. I considered it a case of true pyorrhea. The tooth was lost. But I have never seen five cases with exactly similar conditions.

DR. WALKER. I will ask Dr. Beach to tell us what pyorrhea alveolaris is. We meet with many cases of calcic pericementitis. He has told us what is not pyorrhea; I would be glad if he would tell us what it is.

DR. BEACH. It is a destructive inflammation of the pericemental membrane and alveolar process, without calcareous deposits; that is, the calcareous deposit in itself is not pyorrhea.

DR. WALKER. Can you have true pyorrhea and calcific deposits together?

DR. BEACH. You can have both.

DR. WALKER. How can you tell which is which?

DR. BEACH. If it doesn't get well it is pyorrhea.

DR. SARRAZIN. It seems it is not much use to discuss the meaning of terms, but it would avoid confusion if we could have terms with a definite meaning. Pyorrhea means "a flow of pus;" alveolaris "from the alveolus." Unless there is a flow of pus we have not pyorrhea alveolaris. As to the deposits, they may be either salivary or serumal; deposits with no flow of pus are easy to handle, but that is not pyorrhea alveolaris.

Dr. W. T. Arrington. I had an interesting case of pyorrhea some weeks ago. My son was operating for a patient and called me in, and I found a case of pyorrhea of the two lower bicuspids. One was so loose that we concluded to take it out and see the condition of the root. It had five little pendants or fleshy buds upon the root. It had stood up higher in the socket than the other teeth. I introduced a drill in the socket, and then twenty-five per cent. sulfuric acid, cleansed the root thoroughly and replanted it, holding it with ligatures. He came back two weeks later to show me that it was perfectly tight and apparently in normal condition.

Dr. C. N. Peirce. I have no claim upon your time, and I thank you for the privilege of continuing the discussion of pyorrhea, which I have listened to with interest. We too often make the mistake of taking the symptoms for the disease. Pus is simply an expression of pyorrhea. By pyorrhea alveolaris we mean "pus in the socket;" it is a conspicuous symptom, and we seek to eliminate that condition. Five years ago I noticed in connection with this condition of pus in the sockets other systemic conditions, and by continued observation I found that in four-fifths of the cases I also had some expressions of a gouty condition of the uric acid diathesis. In four-fifths, if not in nine-tenths of the cases, there was some expression of the uric acid diathesis. I took the accumulation from the roots of the teeth to Professor Congdon, and asked him to analyze them carefully. He reported that they consisted largely of urate of soda, urate of lime, and uric acid crystals. I said to the patients, I would suggest that you begin systemic treatment for the uric acid diathesis; place yourselves on a diet as though for a case of gout. I also prescribed lithia and hot water. You cannot imagine my joy when I found the gums healing up at once with no local treatment. I said, Why did I not see that before? These patients that I have been treating for pyorrhea all have gouty symptoms. Treating the patients for gout cured the pyorrhea. But pyorrhea does not stay cured. You can arrest the progress of the disease, stop the accumulations and the exudation of pus; but let your patient indulge in elaborate dinners and suppers, eat heartily of meat, and drink wines, and he must suffer for it. The waste products in the system are not eliminated, and pus in the sockets again becomes profuse. According to their habits of life, you must see them at greater or less intervals: some every year or two years, and others every month or every week. In a large number of cases the teeth will eventually be lost. Pyorrhea is an expression of the uric acid diathesis. I have found this to be true of all my patients except two, who were diabetics. There is a condition of pyorrhea belonging to diabetes that is as readily differentiated as whooping cough from measles. It is characterized by a peculiar expression of the gums; an inflammation of the gingival borders, due to tartar on the necks of the teeth. That is not true pyorrhea; it is amenable to local treatment, and they do not lose the teeth. It is an encroachment of tartar upon the soft tissues; but in true pyorrhea the system is loaded with waste products, causing a congestion at the apical space, with an exudation of lime-salts, deposited at the apical end of the tooth from the serum, before there is any destructive action at the gingival border. The serumal exudates work along the root from the apex to the border along the side of the root. When the gingival border is reached, micro-organisms enter and break down the tissues.

Dr. ARRINGTON. Do I understand you to distinctly say that pyorrhea begins at the apex of the root?

Dr. PEIRCE. Emphatically, yes; at the apex, along the same line as in the joints in connective tissue. It is at the end of the root that true pyorrhea begins, without any disturbance at the gingival border; the opening through the gum-tissue is opposite the apical end of the root, the pulp being alive, though the external appearance is the same as that of an abscess from a dead pulp; the discharge is from the region of the apical end of the root, with the pulp intact. It is amenable to treatment. Remove the accumulation through that opening in the tissues. That is why I say that true pyorrhea is an expression of the uric acid diathesis, and must be treated constitutionally, with the addition of local treatment for the external expressions of the disease. I will cite one instance. A lady came to me a month ago. She said, "I have a tooth that is troubling me. I cannot sleep for it. I have consulted three or four dentists, but they all say you are the only one who can give me relief." I examined the tooth and said, "I only want you to take some medicine and modify your habits of life." "Oh!" she replied, "I go to my physician for that; I wish you to treat my tooth." I replied, "That tooth has been treated to death. I will give you this prescription. To-night you need not expect any relief, but to-morrow night you will go to sleep early and you will sleep well all night, and if you will follow my advice you will continue to sleep well after that." She yielded, and I gave her a little bottle of lithia tablets to be taken three times a day in a tumblerful of water, followed by another tumbler of water; this to stimulate the kidneys and carry off the waste products. I also prescribed exercise, the avoidance of so-called butcher meat, using the white meat of chicken, oysters, fish, etc. She experienced no further pain after the second or third night. Her trouble was due entirely to an accumulation of waste products, expression being had at the root of the tooth because of an originally strained condition, due to the use of the mallet, which had established a predisposition to weakness. Hence the pocket, exudation, etc.

Dr. ARRINGTON. You say that it begins at the apex; that there is a formation of pus there. How can that be without extreme pain? There are many cases where there is no pain, and we often wonder why there is no pain in pyorrhea.

Dr. PEIRCE. The tissues are so softened and yielding that in many cases no pain is recognized by the patient.

Dr. J. Rollo Knapp. In the case you mentioned the pain was so severe that the lady could not sleep at night. Why was that?

Dr. Peirce. That was because of the accumulations upon the root. A gentleman came to me the other day wanting a lower molar taken out. I would not take it out. I saw from his feet that he was also suffering from gout. The treatment that I prescribed relieved both his tooth and his toes.

Dr. R. H. Jones. Is your treatment entirely constitutional? Do you not give local treatment also?

Dr. Peirce. To me pyorrhea is but the expression of the uric acid diathesis, and I treat it as such.

Dr. L. P. Dotterer. How do you differentiate between the expression of diabetes and the uric acid diathesis?

Dr. Peirce. Pyorrhea may accompany diabetes; diabetes gives a peculiar inverted appearance of the gums, as if the mucous surface of the outside had been torn off and the inside rolled outward.

Dr. ———. Is the lithia water as good as the tablets?

Dr. Peirce. I prescribe the tablets because I also want the use of hot water. Water is a great remedy. If you can induce your pyorrhea patients to flush the stomach and alimentary canal, you will have accomplished a great deal. I urge them to drink plenty of water, as a remedial agent. It carries off the waste products. Dr. Reese, of Texas, in a paper read before the Louisiana State Society, was the first man who recognized in pyorrhea the result of the uric acid diathesis.

Dr. I. N. Carr. It does not become me to take issue with a man of Dr. Peirce's experience and ability, but when he says that pyorrhea alveolaris begins at the apex of the root I am not prepared to accept that. The cause of pyorrhea has long been a *casus belli*, but its special indication is a deposition of tartar at the necks of the teeth, destroying the adhesion of the gums, penetrating deeper and deeper, until, if the disease is not arrested, the tooth is lost. The gum-tissue loses its adherence to the tooth, but the disease begins at the gum-margin, not at the apex of the root. The starting cause of the trouble is always tartar at the neck of the tooth. If this is removed and a stimulant applied, such as tincture of myrrh, full strength, rubbed on the gums by the patient very frequently, say twenty times a day, you will have gotten rid of the cause.

Dr. Jones. I will relate a little experience, the result of Dr. Peirce's teachings. Shortly after reading Dr. Peirce's earlier articles attributing the disease to the uric acid diathesis—a systemic affection of the blood—a patient came in who had been under my treatment for four or five years for this trouble, which was continually recurring. Having just read Dr. Peirce's articles, I referred the patient to a physician for examination. He found very pronounced indications of the uric acid diathesis, and the teeth were saved by the addition of constitutional treatment to the local treatment I had been giving.

Dr. A. F. S. Wright. This subject is still involved in obscurity. The terms used are not clearly understood, and there is more than one kind of calculus deposited causing degeneration of the tissues. That the painless condition does prevail we all know. I have had some experience with this disease, being a victim to it myself, my own teeth having loosened and being held in by bandages; they are now retained by a bridge. I treat this condition with trichloracetic acid,—using pyrozone in the pockets first,—with very good results.

Dr. W. E. Walker. At the meeting of the Mississippi Dental Association, in 1895, I reported three cases of abscesses at the roots of teeth having vital pulps, the gingival margins being absolutely intact. Two of the cases then reported were acute attacks, with the teeth very rare and elongated. The third was a chronic abscess, with a history of chronic arthritic diathesis. Examination through the fistulous opening in the last case revealed the presence of serumal calculus near the apex of the root. Mechanical removal of the source of irritation, with the subsequent injection of trichloracetic acid, burning away the diseased tissue, effected a cure. One of the acute cases required the administration of calcium sulfid and painting the gum with aconite, iodin, and chloroform. In the other case the abscess, which was at the root of an upper first molar, healed spontaneously after lancing. The tooth was sound, and the mouth in general in healthy condition, with excellent teeth, though the patient was a woman of immoral habits, a "high-liver," and probably accustomed to the use of ardent spirits. At the date of this case, 1890, an alveolar abscess was usually considered *prima facie* evidence of a dead pulp, and as this case presented all the evidences of an acute dental alveolar abscess, there being no cavity of decay, I decided to drill in through the sulcus, but, finding the dentin normally sensitive, I did not drill through to the pulp-chamber, but placed a small amalgam filling where I had drilled in. I treated the case systemically, but did not succeed in aborting the abscess. After lancing and evacuating the pus it healed spontaneously. The gum-margin was intact and the tooth sound. This patient does not reside in my town, and, a young dentist having located near her, she has since sought his services. From him I have recently learned that the first molar with a small coronal amalgam filling is still in good condition, never having given any further trouble, the pulp to all appearances being vital.

In February last I was called upon to treat two more cases, both being acute dental alveolar abscesses on teeth with vital pulps. In both cases the teeth were considerably elongated, necessitating the wearing of a piece of separating rubber, tied over the teeth on the opposite side of the mouth to prevent occlusion of the sore teeth. Both required lancing, though the flow of pus was not very great. Both patients were treated systemically,—tartarlithine,—and both were cured in about a week, and have given no trouble since except a slight attack of pericementitis in the case of the lady, which recovered without any other treatment than a return to the tartarlithine tablets. These patients were brother and sister, the lady probably about fifty-three years of age, the gentleman forty-five. There was no discharge at the necks of the teeth.

## THIRD DAY—*Evening Session.*

The following paper was read by Dr. T. P. HINMAN:

### PHOTO-MICROGRAPHY.

The value of photo-micrography cannot be overestimated as an illustrative method for books on histology and pathology. The great advantage it possesses over drawings is the simple fact that the mind of the artist cannot be drawn into his pictures, as is so often done, to illustrate some pet theory that the author may have. Drawings are always misleading, as the artist, intentionally or unintentionally, gives his views of the situation instead of a picture of the actual tissue involved. The difficulties in this work, in the majority of cases, I believe, are very much overestimated, as any one who can intelligently manage the microscope and has a limited knowledge of photography can make a photo-micrograph. The apparatus can be bought very cheaply. I believe there is one which can be bought for thirty dollars, which can be attached to any microscope-stand with a solid base. Three-quarter and one-fifth objectives, with two-inch and inch and one-half eye-pieces, are all that are essential in the simpler work in microscopic photography. Where colored or stained objects are to be photographed, orthochromatic or color-correct plates are essential; but in ordinary work, in tooth or bone sections, the ordinary photographic plate, of any good standard make, is all that is necessary. The best results I have obtained have been accomplished by using the following developer, which does not fog the plates, and gives the very finest detail. It is called Carbutt's eikonogen and hydrochinon developer, and is made as follows:

| A. | | B. | |
|---|---|---|---|
| Distilled water, | 20 ozs.; | Distilled water, | 20 ozs.; |
| Sulfite of soda crystals, | 4 ozs.; | Carbonate of potash, | 2 ozs.; |
| Eikonogen, | 330 grs.; | Carbonate of soda crystals, | 2 ozs.; |
| Hydrochinon, | 160 grs.; | Water to make up to | 32 ozs. |
| Water to make up to | 32 ozs. | | |

C.

10 per cent. solution bromide potash.

To develop, take

| | |
|---|---|
| A, | 1 oz.; |
| B, | ¾ oz.; |
| Water, 4 ozs. | |
| Add three drops of C. | |

NOTE.—More of A will increase density; more of B will increase detail and softness. Temperature of developer should not vary much below 65° nor above 75°. The after-treatment is the same as with any other developer.

Let the development continue until the blacks look quite strong, and detail showing in the high lights; wash off developer, then immerse in

CARBUTT'S NEW ACID FIXING AND CLEARING BATH.

| | |
|---|---|
| Sulfuric acid, | 1 dr.; |
| Hyposulfite of soda, | 16 ozs.; |
| Sulfite of soda, | 2 ozs.; |
| Chrome alum, | 1 oz.; |
| Warm water, | 64 ozs. |

N. B.—During cold weather use only half the quantity of chrome alum as above.

Dissolve the hyposulfite of soda in forty-eight ounces of water, the sulfite of soda in six ounces of water; mix the sulfuric acid with two ounces of water and pour slowly into the sulfite soda solution, and add to the hyposulfite; then dissolve the chrome alum in eight ounces of water and add to the bulk of solution, and the bath is ready. This fixing-bath will not discolor until after long usage, and both clears up the shadows of the negative and hardens the film at the same time.

Let remain two or three minutes after transparency is cleared of all appearance of silver bromid; then wash in running water for not less than half an hour to free from any trace of hypo solution. Swab the surface with wad of wet cotton, rinse, and place in rack to dry spontaneously; then varnish with plain collodion or Carbutt's "Roxyline" enamel.

Experience has taught me that reduction or intensification of negatives is a failure, and it is best, when such conditions occur, to make a fresh negative. I will now show you some slides that I have made, beginning with No. 1, which is the foot of a common fly magnified one hundred diameters; No. 2 is a photograph of the dentinal fibers radiating from the central pulp-chamber, cross-section root of an upper molar, also magnified one hundred diameters. This shows plainly the radiation of the fibers from a central point, as well as their proliferation at a short distrance from the border of the pulp-chamber.

Slide No. 3 shows a longitudinal section of dentin of a temporary tooth, and shows distinctly the structural difference in the permanent and temporary teeth. In the first the fibers are smaller and more numerous, while in this one there seems to be a coarser fiber, with an increase of the interprismal substance.

Slide No. 4 gives us a cross-section of true bone magnified one hundred diameters, and is photographed to compare especially with slide No. 8, and shows the distinctive difference between cementum and true bone, it showing very distinctly the wide difference between these two structures, although most of the books tell us that cementum resembles true bone very strongly. I must say that, microscopically, it does not.

Slide No. 5 is a cross-section of the root of an upper bicuspid, with a portion of the alveolar process and pericemental membrane. It shows distinctly a laminated cementum and also processes from the dentin extending slightly into the cementum.

Slide No. 6 is photographed to show interglobular spaces, and is made to compare with slide No. 7, which is made from a drawing by Heitzmann. By comparison of these two, you can readily see the difference between a photo-micrograph and a drawing from a man's hand.

Slide No. 8 is a cross-section of dentin of a bicuspid between the roots, and shows the beautiful arrangement and anastomosis of the dentinal fibers.

Slide No. 9 is a photograph of the cells of Czermak, or so-called interglobular spaces. It is quite often confounded with the interzonal layers. It also shows the striæ of Retzius in the enamel.

Slide No. 10 is the longitudinal section of the horn of dentin in an upper molar, showing distinctly projections from the dentin into the enamel and a beautifully defined interzonal layer. These projections have been observed by Abbott, Heitzmann, and latterly by Williams, Abbott calling them papillæ extending from the dentin into the canal.

Slide No. 11 is the same section, only magnified five hundred diameters, and shows the interzonal layer much more perfectly, and also the beaded condition of the dentinal fibers, which, no doubt, has been caused by the drying out of the water in the dead fibers.

Slide No. 12 gives us a photograph of the interzonal layers magnified one thousand diameters, and shows fibers extending from the dentin through the interzonal layer into the enamel.

Slide No. 13 shows a longitudinal section of the tooth of a young dog, giving us dentin, interzonal layer, enamel, and a perfect Nasmyth's membrane.

Slide No. 14 shows us a photograph of calcific matter deposited in the canal of an upper molar tooth, while No. 15 shows us a small piece of this structure magnified eight hundred diameters, and shows us distinctly what it is.

Slide No. 16 shows us a cross-section of dentinal fibers magnified one thousand diameters, and gives us a peculiar condition, which appears to be the fibers drawn out from the tubes of the dentin.

Slide No. 17 is a cross-section of enamel, lower molar, showing primary decay in a sulcus. The area to where the acid fermentation has penetrated is distinctly seen.

Slide No. 18 shows us a photograph of a longitudinal section of enamel and dentin, with a peculiar projection of dentinal fiber into the enamel just where the interzonal layer ought to be; it also shows the breaking up of the enamel-prisms where Nasmyth's membrane has been worn away, and the ends of the enamel-rods have been exposed.

You will observe that I am not attempting to advance any theory of my own, but am simply giving you the results I have obtained with my camera, and leave them with you for your consideration.

(To be continued.)

## WASHINGTON CITY DENTAL SOCIETY.

THE regular monthly meeting and thirty-first annual banquet of the Washington City Dental Society were held at the Oxford Hotel, December 14, 1897. The officers elected for the ensuing year are as follows: W. N. Cogan, president; C. W. Appler, vice-president; R. W. Talbott, secretary; M. F. Finley, treasurer; H. B. Noble, librarian; J. H. P. Benson, essayist.

R. W. TALBOTT, *Secretary*,
1111 F street, N. W.

# DENTAL SOCIETY ANNOUNCEMENTS.

## MASSACHUSETTS BOARD OF REGISTRATION IN DENTISTRY.

A meeting of the Massachusetts Board of Registration in Dentistry, for the examination of candidates, will be held in Boston Monday, March 7, 1898, at 10 A.M., at Harvard Dental Infirmary, North Grove street. Examination in operative dentistry at 11 o'clock.

Each candidate must come prepared with rubber-dam, gold, and instruments to demonstrate his skill in operative dentistry. Any one who wishes may bring his patient. So far as possible patients will be furnished.

The theoretic examination will include anatomy, physiology, histology, chemistry, pathology, materia medica, operative and prosthetic dentistry.

All applications, together with the fee of twenty dollars, must be filed with the secretary of the board on or before March 1, as no application for this meeting will be received after that date. The next meeting will be held in June, 1898.

G. E. Mitchell, D.D.S., *Secretary*,
25 Merrimack st., Haverhill, Mass.

## ODONTOGRAPHIC SOCIETY OF CHICAGO.

The Odontographic Society of Chicago, the largest association in the United States except the American Dental Association, will celebrate its tenth anniversary February 21 and 22, 1898.

We shall spare no effort to make the event memorable in every respect, and to that end have planned a convocation which shall extend over two days, and shall consist of clinics and scientific papers from men especially distinguished and representative in the science of dentistry.

Members of the profession are cordially invited to attend, and to present papers, clinics, or new dental appliances, as they may desire.

As the time is short for the extended preparations contemplated, those who wish to attend should promptly notify the Executive Committee.

C. E. Bentley, *Chairman*,
100 State st., Chicago, Ill.

## ST. LOUIS DENTAL SOCIETY.

At the regular monthly meeting of the St. Louis Dental Society, held at the Lindell Hotel on January 4, 1898, the officers for the ensuing year were elected as follows: Dr. John G. Harper, president; Dr. M. C. Marshall, vice-president; Dr. James C. Chisholm, corresponding secretary; Dr. W. G. Cox, recording secretary; Dr. A. J. Prosser, treasurer. Drs. W. N. Conrad, J. P. Harper, J. G. Pfaff, committee on ethics and election; Drs. J. H. Kennerly, F. F. Fletcher, Emma E. Chase, committee on publication.

Meetings will be held on the first Tuesday evenings of each month, at the Lindell Hotel.

James C. Chisholm, *Cor. Sec'y.*

## NORTHERN IOWA DENTAL SOCIETY.

At the meeting of the Northern Iowa Dental Society, held at Mason City, September 7, 8, and 9, 1897, the following officers were elected for the ensuing year: Dr. G. N. Beemer, president; Dr. A. N. Ferris, vice-president; Dr. G. H. Belding, treasurer; Dr. Wm. H. Steele, secretary, Forest City, Iowa.

## VERMONT STATE DENTAL SOCIETY.

The twenty-second annual meeting of the Vermont State Dental Society will be held at Hotel Berwick, Rutland, March 16-18, 1898.

Thomas Mound, *Rec. Sec'y.*
Grace L. Bosworth, *Cor. Sec'y.*

## NORTH CAROLINA STATE DENTAL SOCIETY.

The twenty-fourth annual meeting of the North Carolina State Dental Society will convene at Fayetteville, N. C., on Wednesday, May 11, 1898. All dentists in good standing are cordially invited to be present.

The State Board of Dental Examiners will meet at the same place on Monday, May 9, preceding, for the examination of all candidates for license to practice dentistry in this state.

C. W. Banner, *Secretary,*
Mount Airy, N. C.

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# EDITORIAL.

## THE HUMAN SIDE OF THE DENTAL PRACTITIONER.

It is presumed that all will recognize the possibility that he possesses a human side, even those occasional individuals among the laity whose ideal of the dentist is that he is a sort of fiend incarnate, who delights in the infliction of pain and has an uncontrollable penchant for "boring into the nerve." Nor is it his human relationship outside his profession that here concerns us. Evidences are not wanting which tend to prove that as a member of society he fulfills his function creditably to himself as a part of the body politic, and that his philanthropy is, in general terms, at least as broad as that of the average of his kind. He has, however, a dual relationship in life, and toward each his human nature does not in all cases react in equal degree or with the same result. His environment includes the community of individuals with whom his lot is cast, each one of which is a possible patient who may become a contributor to his material welfare; hence is to be viewed with the consideration which such a possibility renders expedient. His environment still further includes the wide circle of his professional colleagues, any one of whom may become a rival, and so interfere with his material welfare. In too many cases this implied relationship, even though imperfectly recognized, establishes conditions toward which the human nature of parties reacts with unpleasant consequences. Certain it is that his professional relationships and his social relationships other than professional often develop totally opposite characteristics in the same individual.

Any one who has thoughtfully followed the literature of dentistry through a number of years must have noted how often it happens that men known to be peaceable, generous, civil, and kindly disposed in their habit of life exhibit qualities quite the reverse of these, and become aggressively pugnacious when some pet idea or belief which they may entertain is called in question by a colleague. It would seem that an honest criticism publicly expressed is regarded by many as tantamount to a charge of dishonesty, and is resented as such. The subtleties of the reactions of human nature toward stimuli of that character are almost beyond comprehension. Why we should set to quarreling like a pack of hungry curs over a bone when, for example, a question of priority of invention or discovery is raised among us is difficult to understand, unless we are prepared to admit that we are not as far advanced intellectually as we have claimed to be.

It too often happens that our ethical logic is at fault in being considered applicable only to others and not to ourselves,—is lacking in that just balance between the relations of *meum* and *tuum* which we call equity. When we have proclaimed ourselves the originator of one of those valuable ideas that will certainly revolutionize the whole technique of dental practice, and lift us to that pinnacle of human altitude where a generous profession and a grateful public will hail us as benefactors of our race, it is truly discouraging, we admit, to have some cold-blooded and unsympathetic, practically-minded colleague puncture the inflated error upon which our air-castle has been built, and demolish the whole structure. But in that case, who is the real benefactor,—the propagandist of the truth, or the owner of the *débris* of the air-castle? The decision is easily made by all excepting the latter; and why should he withhold his approval of the one who pointed out his fault?

Has the time not arrived when the gratitude of all should be meted out liberally to the man whose light points the way toward truth in any degree? As it is, if he would attempt such work he must expect to suffer from the effects of the wounded vanity of those who, like the historical Gadarenes, frothed at the mouth and manifested various other phenomena of excitement when treated for the expulsion of their evil spirits.

It is not here the intention to imply that the human side of dentists is characterized wholly by the tendency outlined. Far from it. There is so much that is commendable in the dental professional relationship that the faults arising from selfishness and vanity are all the more glaring by contrast. It may be truly said that dentistry is as free from such tendencies as any of the so-called learned professions. But why should these elements cut any figure at all in our professional relationships? Has not our experience as a profession been long enough and broad enough to make us realize that error is a barrier to progress, and that the man who removes that barrier is a professional benefactor? Too many pages of our periodicals are devoted to polemics and to the exhibition of wounded feelings,—pages that could be better devoted to telling truth of practical value to all of us.

The progress made by dentistry is so trite a topic that it is hardly within the limits of good form to further allude to it; yet there is room for more progress,—a development which will make personal controversy unpopular and limit the discussion of opinion to the scientific lines of strictly impersonal debate. It is such conditions which more than all others will determine our right to the term liberal profession, or otherwise; for the element of liberality is measured by the character of the individuals who comprise the professional guild rather than by the department of nature which is the subject of their special study.

## PROFESSOR W. D. MILLER.

We have much gratification in being able to announce that Professor Miller's health, which for some months past has been in a precarious condition, is now decidedly better. We are informed by one of Professor Miller's friends that he has recently received a letter from him in which he says, "I am happy to say that I am much better in health; I am lecturing two hours every week, and work two hours every day at my chair." We feel sure that the many friends of Dr. Miller and his admirers throughout the dental profession will be pleased to learn of his improved health and increasing ability to give attention to his work.

## THE INDIANA DENTAL JOURNAL.

THIS new candidate for dental favor makes its appearance with the January issue of the current year, and gives promise of winning its share. It is attractively dressed, and contains a fair amount of well-selected matter. We have always questioned the propriety, if not the good taste, of incorporating a humorous department in a dental journal. If done at all, it should be well done, of course, and the editor has at least shown a nice discrimination in his humorous selections, which are somehow in accord with the spirit of his salutatory. That editorial natal effusion exhales an aroma of hopeful pleasantry quite encouraging to those of us whose pristine tendency to frivolity has long since evaporated in the editorial treadmill, and, "May the gods make you merry, sir!"

## EXCESS OF MATTER.

OWING to the demands upon our space, we are obliged to postpone until our next issue the publication of a number of reports, obituaries, original communications, book notices, etc., already in type.

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# OBITUARY.

## RESOLUTIONS ON DEATH OF DR. THOMAS W. EVANS.

AT a special meeting of the American Dental Club of Paris, held at the office of its president, Dr. G. C. Daboll, on Saturday evening, December 11, 1897, the following resolutions were unanimously adopted:

WHEREAS, By the sudden death of Thomas W. Evans, M.D., D.D.S., Ph.D., which occurred at his home in Paris, Sunday evening, November 14, 1897, this club loses one of its most assiduous members, and our profession one of the most remarkable men that has ever graced its ranks; therefore, be it

*Resolved*, That the American Dental Club of Paris deeply deplores the death of so eminent a colleague, who, as its first president, and as a fellow-member ever alert to the interests of the club and the profession, always commanded the profound respect of all.

*Resolved*, That we as a body of American dentists whose lot by various circumstances has fallen in a foreign land, while gratefully acknowledging the hospitality of our sister republic and our gracious adoption by her people, feel it but just to acknowledge our gratitude to Dr. Evans, who, as one of the great pioneers of the dental profession, has done so much to break down old prejudices and prepare the way not only for us, but for every dentist whose heart is in his work, and whose object is to benefit mankind.

*Resolved*, That we regard his success in securing the recognition of all the nations of Europe, of the beneficence of dental science and art as first understood and practiced in America, as of the greatest importance to the public, as well as to the dental profession.

That influence was strongest during the first twenty-five years of his practice, during the plastic period of the evolution of dental science so especially active in America.

On account of his influence in the highest circles the way has been made easier to convert conservative Europe to modern methods of conservative dentistry, and not only every member of this club and every American dentist of Europe, but every native dentist as well, has been benefited by that influence, and we believe that above all, by the adoption of modern methods, such a stimulus has been given to *all* dentists of *all nationalities* as will one day render dental science a *universal* and not merely a *national* science, as it was during a great portion of Dr. Evans's career.

*Resolved*, That while we recognize the influence of others of his contemporaries, he played a principal rôle owing to the peculiar position brought by his unparalleled success,—such success being due to his personal magnetism, high-mindedness, affability, practical common sense and tact.

*Resolved*, That this club regards the numberless honors conferred upon Dr. Evans by the various sovereigns of Europe as the just tokens of appreciation of the dental profession through one of its great representatives, and it is proud that he was an American, and proud he was a member of this club.

And notwithstanding his pecuniary success, his unlimited honors, and his long sojourn away from his native land, we know that while being faithful to his duties in foreign lands, his loyalty and affection for his own country never diminished.

He was first, last, and always a dentist, and proud to be considered one, and despised that *snobbism* which makes some men ashamed of the profession to which they owe all their success in life.

*Resolved*, That we believe the name of Dr. Thomas W. Evans deserves a place with other great names in the history of the development of dental science.

*Resolved*, That our sympathy be extended to the relatives and friends of Dr. Evans; that a copy of these resolutions be handed them, and that a full record be made and preserved by the secretary of the club in its procedures; and that a copy be sent to the dental journals of America for publication.

*Resolved*, That as a token of respect to our late *confrère*, the American Dental Club of Paris join in a body to attend his funeral.

(Signed by John W. Crane, Isaac B. Davenport, J. H. Spaulding, committee.)

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At a meeting of the American Academy of Dental Science, held January 5, 1898, the following minute was adopted:

Dr. Thomas W. Evans died suddenly of angina pectoris in Paris, November 14, 1897, aged seventy-four years. He was born in Philadelphia in 1823, and received in that dental center, in his youth, theoretical training and practical experience in fine metallurgy and in dentistry. At an early age he was led by Dr. Brewster to go to Paris, and he there achieved one of the most brilliant careers which any dentist has ever accomplished. He was proficient in dental manipulations in the days when there were fewer skilled practitioners than there have been in recent years; and his other strong qualities enabled him to secure and retain as patients many of the most prominent persons of the world. His services were not confined wholly to the routine of dentistry, but his abilities found channels for action in various hygienic, sanatory, and reform measures, and in a private diplomacy for which he was fitted by nature, and for the exercise of which he had unusual opportunities. In addition to his work as a brilliant practitioner, his career was a marked illustration of the fact that the practice of our calling is not incompatible with high social position and the attainment of many honors through faithful service in other capacities. Born in America, and with American general and professional education, he kept up his acquaintance with our people and his friendship for our institutions. Embracing opportunities for lucrative investments, he became very wealthy; and it was his cherished design, whose fulfillment it is to be hoped no circumstances will frustrate, to devote a large part of his accumulations to the establishment of art and educational institutions in his native city.

Dr. Evans had been for many years an honorary fellow of the American Academy of Dental Science. In recognition of his high career and in testimony of our respect to his memory, we devote these pages of our records to this expression concerning him; and we would commend to our members the emulation of all that was worthy in his example of thorough preparation for the life-work, of diligence in its pursuit, and of broad-spirited usefulness to the world as a man, a citizen, and a bestower of the rewards of his labors.

(Signed by Charles A. Brackett, Robert R. Andrews, Eugene H. Smith, committee.)

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# DENTAL LEGISLATION.

## Dental Law of Georgia.

A Bill to be entitled An Act to establish a Board of Dental Examiners, prescribe its powers and duties, and to regulate dentistry, and the practice thereof, and to repeal existing laws regulating the same, and for other purposes.

Section I. Be it enacted by the General Assembly of the State of Georgia, and it is hereby enacted by authority of the same, That it shall be unlawful for any person to engage in the practice of dentistry in the State of Georgia unless said person shall have obtained a license from a Board of Dental Examiners, duly authorized and appointed under the provisions of this act to issue licenses; provided that this act shall not affect the right of dentists to practice dentistry who have lawful right under the laws of Georgia to practice dentistry at the time of the passage of this act.

Sec. II. Be it further enacted, That a Board of Examiners is hereby created, to be known as the Board of Dental Examiners of Georgia. The members of the board shall be appointed by the Governor of Georgia upon the recommendation of the Georgia State Dental Society, as follows, to wit:

The State Dental Society shall nominate at its first annual meeting after the passage of this act ten reputable practicing dentists, who have been in the practice of dentistry in this state for five years or over at the time of their appointment, five of whom shall be members of the State Dental Society of this state and five non-members. From such names the Governor shall appoint five persons who shall compose the Board of Dental Examiners of Georgia, and hold their terms for one, two, three, four, and five years, according to their appointment and commission; and every year thereafter said Dental Society, at its annual meeting, shall select four names, two members of such society and two non-members, who shall have the same qualifications as hereinbefore provided for the members previously elected, from which number the Governor shall appoint one person to be a member of said board, who shall hold his office for a term of five years; provided that nothing in this act shall interfere with the members of the present board serving in office to the end of the period for which they were elected. And said members, to wit, J. H. Coyle, of Thomasville, Ga.; A. G. Bouton, of Savannah, Ga.; B. H. Catching, of Atlanta, Ga.; H. H. Johnson, of Macon, Ga., and D. D. Atkinson, of Brunswick, Ga., until the expiration of their said term, to wit, at the annual meeting of the Georgia State Dental Society for the year 1898, and until their successors are appointed and qualified, be and they are hereby made the members of said board. In case of vacancy in said board, such vacancy shall be filled by appointment of the Governor upon the recommendation of the president of the Georgia State Dental Society.

Sec. III. Be it further enacted, That it shall be the power and duty of said board to organize by the election of one of its members president and another secretary and treasurer; to meet immediately after the commencement of each dental college of this state in the town where the same is located, and meet annually and regularly at the time and place of the regular meeting of the Georgia State Dental Society; and to hold such meetings in any county in this state as often as the business and duties of the board may require, the calls for such meetings to be made by not less than three members of the said board, and a written notice of the time and place and object of said called meeting to be mailed by the secretary and treasurer of said board to all the members thereof not parties to the call, at least fifteen days before the day of meeting; to examine all applicants for licenses to practice dentistry who are entitled under this act to be examined, and to issue licenses to practice dentistry according to the provisions of this act; to collect and apply all fees as directed by this act; to keep a book showing the names of all persons to whom licenses have been granted by said board to practice dentistry, and such other books as may be necessary to plainly show all the acts and doings of said board; to have and use a seal bearing the name, "Board of Dental Examiners of Georgia."

Sec. IV. Be it further enacted, That each member of the board shall, upon his qualification, file with the secretary and treasurer his post-office address, and thereafter a notice of any change therein. Any notice sent to the address so on file shall be deemed to comply with the requirements of this act as to notice to them.

Sec. V. Be it further enacted, That all books of said board shall be books of public record, and at all times, except on Sunday and public holidays, be kept open to public inspection. A certified copy of any part or all thereof shall be primary evidence in any court of this state. The original book shall be kept in the office of the secretary and treasurer of said board, wherever he may reside, and he shall furnish to any person making application therefor a copy of any part thereof upon the applicant paying a fee of fifteen cents per hundred words so copied, the said fee to belong to the secretary and treasurer. All certified copies shall be certified by the secretary and treasurer.

Sec. VI. Be it further enacted, That said board shall examine all applicants furnishing satisfactory evidence of having graduated from a school of dentistry whose term and curriculum is equal to that of a majority of schools of dentistry of the United States, or furnishing satisfactory evidence of having been licensed after examination by any other state board; and if such applicant pass a satisfactory examination, a license to practice dentistry shall be granted to the applicant.

Sec. VII. Be it further enacted, That if any dentist shall be guilty of cruelty, incapacity, unskillfulness, gross negligence, indecent conduct toward patients, or any such professional misbehavior as show unfitness upon the part of the dentist to practice, shall be guilty of a misdemeanor, and on conviction in any court of this state having jurisdiction of such offenses shall be fined as prescribed in Sec. 1039 of the Penal Code of 1895, and his license to practice dentistry shall be revoked by the board.

Sec. VIII. Be it further enacted, That any dentist or other person who shall at any hearing before the board, either by himself or by his procurement, make any false statement or misrepresentation with intent to deceive or mislead said board shall be guilty of a misdemeanor, and upon conviction before any court having jurisdiction of said offense be fined as prescribed in Sec. 1039 of the Penal Code of 1895, and such dentist's license to practice shall be revoked by the board.

Sec. IX. Be it further enacted, That any person who, in violation of the provisions of this act, shall practice, or attempt to practice, dentistry in this state shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished as prescribed in Sec. 1039 of the Penal Code of Georgia of 1895; provided that nothing in this act shall be construed to prevent any person from extracting teeth without fee or reward.

Sec. X. Be it further enacted, That in order to provide the means for carrying out and maintaining the provisions of this act, the said Board of Examiners may charge in advance each person applying or appearing before it, for each entire examination for license to practice dentistry, a fee of ten dollars ($10.00), which in no case shall be refunded to the applicant. Out of the funds coming into the possession of the board, when so collected, the members of the board may receive as compensation the sum of four dollars ($4.00) each for each day actually engaged in the duties of their office and all necessary expenses incurred in attending the meetings of the board, or in prosecuting cases. Said expenses shall be paid from the fees received by the board under the provisions of this act, and no part of the salary or other expenses of said board shall ever be paid out of the state treasury. All money received in excess of said expenses above provided for shall be held by the secretary of the board as a special fund for meeting the expenses of said board, he giving such bonds as the board shall from time to time direct and receive such compensation as the board shall prescribe. The said board shall make an annual report of its proceedings to the Georgia State Dental Society, together with all moneys received and disbursed by the said board pursuant to this act; provided that should an amount exceeding three hundred dollars be at any time accumulated over and above the legitimate expenses of the board, all moneys in excess of this amount shall be paid into the common school fund of the state.

SEC. XI. Be it further enacted, That all persons licensed by said board to practice dentistry shall cause such license to be registered by the clerk of the Superior Court in the county or counties in which such persons may desire to engage in the practice of dentistry, and said clerk of the court shall issue a certificate to that effect and receive a fee of fifty cents for same. Any failure, neglect, or refusal on the part of any person holding such license to register the same with the clerk of the court as above directed, for a period of six months, shall work a forfeiture of the license, and no license when once forfeited shall be restored except upon the payment to said Board of Examiners the sum of ten dollars ($10.00). The temporary license hereinafter provided for need not be recorded.

SEC. XII. Be it further enacted, That three (3) members of said board shall constitute a quorum for the transaction of business, and should a quorum not be present upon the day appointed for the meeting those present may adjourn from time to time until a quorum is present.

SEC. XIII. Be it further enacted, That in cases where a person is entitled to examination for a license, one member of said board may examine him and furnish a temporary license to any applicant to practice dentistry until the next regular annual meeting of the board, when he shall report the fact, at which time the temporary license shall expire; but such temporary license shall not be granted by a member of the board after the board has rejected the applicant. For conducting said examination, the member of said board conducting the said examination may in advance charge and receive a fee of five dollars, to be applied to his own use for his services in examining the applicant. No other fees shall be charged for granting the temporary license.

SEC. XIV. Be it further enacted, That it shall be unlawful for any person to practice dentistry or do any dental operation under the protection of another's license.

SEC. XV. Be it further enacted, That all persons shall be held to be practicing dentistry within the meaning of this act who shall charge a fee or salary or other reward, to be paid either to him or another person, for operations or parts of operations of any kind in the treatment of diseases or lesions of human teeth or jaws, or extracting teeth, or in correction of the malpositions thereof; provided that nothing in this act shall apply to regularly licensed physicians in extracting teeth and charging a fee therefor, or performing surgical operations.

SEC. XVI. Be it further enacted, That all dentists in the actual practice of their profession in this state be and they are hereby exempt from jury duty, provided that this exemption shall not operate to disqualify those dentists who may wish to serve.

SEC. XVII. Be it further enacted, That all the laws heretofore enacted and existing in the State of Georgia referring to dentistry and the practice thereof, and to the several particular matters contemplated in this act be and the same are hereby repealed, and all laws in conflict with this act be repealed.

# PERISCOPE.

HERE IT IS AGAIN!—The *Dominion Dental Journal* records a death during the administration of choloroform for tooth-extraction. Dr. Bell, the patient's regular physician, was summoned to administer chloroform, which anesthetic the patient asked for. Dr. Bell made a searching examination on the bared chest of the lungs and found them, apparently, in a healthy, normal condition. He then slowly administered equal parts of chloroform, ether, and alcohol. When under control, the dentist was led to remark that he had never witnessed a patient whose pulse remained so strong while anesthetized. Dr. Bell says the patient's pulse was then at seventy-two, and she was respiring easily. A moment later, as the dentist was preparing to operate, he noticed that her respiration became somewhat irregular and labored. He at once began administering restoratives and sent at once for other medical assistance, Dr. V. Sullivan responding. Meanwhile the pulsation of the heart continued firmly, but respiration became more difficult. This continued for at least ten or twelve minutes, Drs. Bell and Sullivan doing their utmost to restore consciousness. Artificial respiration was resorted to, but to no avail; the heart ceased beating. and earthly means proved of no avail to induce it to resume its function. Dr. Connell on examination of the body found in the main blood-vessel leading from the heart to the head, at a spot near where smaller blood-vessels branch off, an aneurism, or rupture, which had allowed blood to flow into the left lung, causing death. About a pint and a half of blood was found in this lung. A portion of the back-bone near the spot where the rupture occurred was also found in a diseased condition, and which had been affected for some months. The affected part of the back-bone had rotted away, but this would not, at its present stage, cause death. It would be impossible for a physician to detect the aneurism of the blood-vessel, as it was protected from the back by the back-bone, and from the front bv the breast-bone, lungs, etc. A sudden strain or excitement resulting in increased action of the heart would cause this aneurism to burst, causing death. The heart was perfectly healthy, large, but not unduly so for so large a woman. The brain also was quite healthy. Some of the organs of the body showed signs of disease, but not in such an advanced state as to cause death.—*Dental Record.*

ORTHOFORM.—Einhorn and Heinz (*Ther. Monatshefte,* October, 1897) have discovered a local anesthetic to which they have given the name of orthoform. It is a white, light, crystalline powder, without taste or smell. It is only slightly soluble in water, and therein lies its chief value. It dissolves just fast enough to cause a lasting anesthetic influence. Its action is observed upon mucous membrane, granulation tissue, or the surface of a wound. Either as a powder or mixed in a salve it is especially adapted for use upon burns of the third degree, upon painful ulcers, carcinomatous or otherwise. The remedy is absolutely non-poisonous. It limits the amount of secretion, absolutely prevents putrefaction and fermentation, and as a stimulating, healing dressing for a wound it has much to recommend it. In painful ulcers of the larynx, a single treatment with this drug will reduce the smarting during a period of twenty-four hours. It may be used internally for the relief of stomach or intestinal pain. Its action is especially noticeable in ulceration and carcinoma of the stomach, but in cases of chronic gastric catarrh or dilation little benefit is to be expected from its use. The muriate of orthoform is freely soluble and may be used internally, but is not adapted to subcutaneous injections on account of the intense pain which the acid solution occasions. On account of the lack of poisonous qualities it may be dusted upon surfaces *ad libitum.* In salves a strength of ten per cent. is recommended. Internally, from five to fifteen grains may be daily administered.—*Medical News.*

How to Insert Root-Canal Dressings.—Sometimes one feels uncertain whether the cotton which has previously been dipped into some medicament has been successfully placed in the pulp-canal, because, having lost its stiffness by becoming damp, it seems to pack in a lump in the pulp-chamber. This may easily be overcome by making the cavity reasonably dry, forcing a hard, dry twist of tapering cotton up the canal, and then apply the medicament to this by a pellet of wool; capillary attraction will do the rest. It may be desirable afterward to place cotton over this, but it should not be allowed to absorb the medicament placed on the first pellet. This may be prevented by placing between the two a small piece of rubber-dam, cut to size, with or without a little varnish to hold it in place. If this be placed carefully there will be no disagreeable taste in the mouth when coal tar and other preparations are used.—*Ohio Dental Journal.*

Rubber Matrix.—In regard to the filling of the incisors with cement, where there are two adjacent cavities, and it is desirable to fill them with one mixing of the cement, a neat matrix may be found in a narrow ribbon of rubber-dam drawn taut over the adjacent tooth until the cavity is filled, and then reversed over the new filling until the second cavity is filled. After the fillings are sufficiently hard, the strip may be trimmed quite close with a little tension while cutting, and what remains will act as a separator, so that at the next sitting there will be no trouble in properly finishing the filling. It may be added that the patient can very often hold the strip in place.—*Ohio Dental Journal.*

Sensitive Dentin.—Dr. Osmun writes, in the *International Dental Journal:* "My theory for several years has been, in reference to obtunding sensitive dentin, that the best method is to have clean, sharp burs, steady hands, an engine revolving at a moderate speed, but running steadily, telling the patient you are going to hurt him a little, and then doing the work deftly and quickly. Up to the present time I have not found anything that I would trade off for my sharp, up-to-date instruments, deftly handled."—*British Journal Dental Science.*

The *Chemist and Druggist*, September 11, 1897, has the following with reference to the British Dental Law:

"The Dentists' Act does not interfere with the performance of dental operations, except that a person not registered under it cannot recover any fee for such in a law court. Nor can he assume the title of dentist, dental practitioner, or anything similar."

Uninflammable Celluloid.—A process has been patented by a M. Asselot for insuring the uninflammability of celluloid. He makes two solutions,—one of one part of ordinary celluloid in ten parts of acetone, and another of two parts of powdered chlorid of magnesium in six parts of alcohol; then makes a paste of the whole. When carefully mixed and dried, an uninflammable celluloid is obtained.—*Chemist and Druggist.*

Dirty Wax.—To renovate dirty wax, melt in water. When cool, scrape the dirt from the under side; melt again in pure water and add one tablespoonful of sulfuric acid when it comes to a boil.—*British Journal Dental Science.*

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## HINTS, QUERIES, AND COMMENTS.

To the Editor of the Dental Cosmos:

*Sir,*—In the December number of your journal I find an enthusiastic article by Dr. Allison R. Lawshe, of Trenton, N. J., describing his method of constructing a set of countersunk teeth on a rubber base.

After reading the article, I concluded that the doctor's acquaintance with this make of teeth was of recent date. I have had a long and varied experience with countersunk teeth, and after faithful trials of every known method which promised beauty and durability, I have been obliged to vote the countersunk tooth a practical failure.

The statement, "that concerning strength there can be no question," cannot possibly be drawn from actual experience. I have found in every case the greatest weakness at the conjunction of the tooth and rubber embracing the incisors, particularly the laterals, with markedly increasing weakness as the molds grow smaller. The lateral strain to which all incisor teeth are subjected is felt more in a set of countersunks than in any other, for the reason that the narrow neck of rubber is so small as to be easily broken or pulled from position.

A repair in a set of this kind only increases the liability of breakage, and utterly destroys the artistic effect. Nothing remains to be done but to make a new set; and is there anything more discouraging than, after devoting long hours and incalculable care to a piece of work, to find it necessary after a few weeks or months to repeat the effort, to say nothing of the annoyance to the patient?

From an esthetic standpoint, I fully agree with Dr. Lawshe that "with due regard to the temperament," as well as the shape of the face, the lips, and the ridge of the mouth, with special study of the articulation, one can make a beautiful set of teeth by his method. But were artistic effect the only feature to be considered in making a set of teeth, one will find that it is only in certain mouths that countersunk teeth will produce the satisfactory results he describes. In some mouths, a set of teeth made by his method would publish the fact of artificiality as loudly as though a sign-board were placed across the face.

I take exception to a further statement, in regard to the "Walker granular gum." I fail to see wherein there is any natural effect or artistic beauty in giving a human being a gum which looks like the breast of a speckled hen. I should call it a burlesque on nature.

My purpose in calling attention to this article is to help young dentists to realize that no one method is faultless; furthermore, my experience has proven that strength and durability are not characteristics of countersunk teeth.
DR. JAMES W. CAMPBELL.

MILWAUKEE, WIS., January 4, 1898.

CAUTION IN CATAPHORESIS.—Within the past year the practicability of cataphoresis has been rather fully tested, and, while there may not be the enthusiasm that was shown a year ago, it would seem that this method of obtunding hypersensitive dentin has about reached the level that it will maintain.

The danger to the pulp is a matter not to be overlooked, and this should be the controlling factor in the selection of cases. It seems that if the process is carried far enough to obtund the pulp to any great extent, trouble will follow. It is almost impossible to obtund the dentin in the walls of a deep cavity, for the reason that the current finding a better conductor in the thin layer of half-calcified dentin at the bottom of the cavity, nearly all of it flows directly into the pulp through the bottom of the cavity. The walls of a deep cavity are not usually obtunded by the current, except in a reflex manner by first obtunding the pulp through the thin layer of dentin at the bottom of the cavity. Herein lies the danger. The pulp is already trembling between life and death by the nearness to exposure, and this condition is not helped by the current of electricity which is very likely to be used in such cases, to the extent that electrolysis of the pulp is produced. In cavities where the pulp is somewhat distant, it is entirely feasible to use the current for obtunding the dentin without endangering the pulp. No one should perform the operation without using a milliameter, not any more for measuring the current flowing through the tooth than for the purpose of detecting whether the current may be leaking around the tooth and producing destructive electrolysis of the gum-tissue.—L. E. CUSTER, *in presidential address before Ohio State Dental Society.*

A METHOD OF REPLACING A BROKEN RICHMOND CROWN.—Among the trials and tribulations that beset the life of a busy dentist, few are as annoying as the difficulty encountered in the fracturing of the porcelain facing of a Richmond crown.

This difficulty can now be prevented by the use of the Mason detachable facing, but there are still in existence many Richmond crowns made before the introduction of this method, and as long as their wearers insist upon eating soft bread and ice cream so long will the strain of such a diet continue to cause an occasional fracture, and this despite our care in construction.

The difficulty, in such a case, of removing the pin, which is usually still firmly fixed in the root, is well known. In many cases its accomplishment is impossible without injury to the root, and in any case it is accomplished only at the expense of a great amount of time.

The method of procedure herein described obviates the necessity for removing the pin, and is as follows:

The band on the labial surface is ground entirely away, exposing the beveled edge of the root. The backing is ground to about one-half its original length and to the shape of an inverted cone.

A second band is fitted over the old one, extending slightly beyond the gum on the labial aspect only; elsewhere it extends just to the gum-margin. On the lingual surface it is made to conform to the original outlines, and is extended a trifle beyond the backing. The band being fitted and soldered, a thin porcelain facing is selected and ground to fit the exposed root. It is then backed and soldered to the band, and we have practically a Richmond crown without a pin.

Before setting, the old backing is roughened and the edges notched to afford more secure attachment for the cement.

When in position this crown is almost identical, in appearance and contour, with the original; it is strong and durable, and the time consumed in its construction is but little more than required to remove the old pin from the root.—JOHN M. FOGG, D.D.S., Philadelphia, Pa.

A CORRESPONDENT propounds the following query, "Will some practitioner who has had practical experience in the use of aluminum crowns kindly furnish us with his views for the benefit of all who are interested?

"Is an aluminum crown affected by the saliva? I have heard that they will corrode. If so, please state the cause. I have made aluminum plates and have never known one to corrode."

# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

**Brandt** (L.) Die Zähne und ihre Behandlung. Populäre Mittheilungen. 3. aufl. Göttingen, 1897, Franz Wunder, 39 p. 8°.

**Dehaine** (V.) Traitement des ulcères de jambe par l'aloès. Par., 1897, Henri Jouve, 64 p. 8°. No. 145.*

**Demptos** (Jean-Marie.) De l'osteotuberculose du maxillaire supérieur et de ses différentes formes. Bordeaux, 1897, Y. Cadoret, 38 p., 2. l. 8°. No. 100.*

**Franchet** (Eugène.) Du traitement des fractures de jambe en général et en particulier par la méthode d'Helferich. Par., 1897, Henri Jouve, 60 p. 8°. No. 134.*

**Gibert** (Joseph.) Sur l'anesthésie par l'éther. Par., 1897, Henri Jouve, 46 p. 8°. No. 527.*

**Godon** (Ch.) Clinique dentaire et dentisterie opératoire. Par., 1897, J. B. Baillière et fils, 294 p. 24°.

**Hankel** (E.) Handbuch der Inhalationsanästhetica Chloroform, Aether, Stickstoffoxydul, Aethylbromid, Pental, Mit Berücksichtigung der strafrechtlichen Verantwortlichkeit bei Anwendung derselben. Für Aerzte, Zahnärzte und Studirende. 2. Aufl. Leipz., 1898, A. Langkammer, 195 p. 8°.

**Kamm** (M.) Die Steuerdeclaration der Aerzte und Zahnärzte. Auf Grund des neuen preussischen Einkommensteuergesetzes. 2. Aufl. Breslau, 1897, Preuss und Jünger, 44 p. 8°.

**Leblanc** (Camille.) Contribution au traitement des fractures du maxillaire inférieur. Par., 1897, Société d'éditions scientifiques, 60 p. 8°. No. 277.*

**Martinier** (P.) Clinique de prothèse. Prothèse dentaire, prothèse orthopédique, prothèse des maxillaires. Paris, 1898, J. B. Baillière et fils, 348 p. 24°.

**Müller** (Joh.) Anästhetica. Ueber die verscheidenen gebräuchlichen Anästhetica, ihre Wirkungsweise und die Gefahren bei ihrer Anwendung. Berl., 1898, Mitscher & Röstell, 188 p.

**Ovize** (Albert.) Les fistules dentaires et d'origine dentaire. [Paris.] Saint-Quentin, 1897, A. Dubois & Cie, 80 p. 8°. No. 214.*

**Papin** (Paul.) Des fractures du maxillaire supérieur. [Paris.] Angers, 1897, Germain & G. Grassin, 104 p., 2 pl. 8°. No. 570.*

**Petit** (Georges.) Manuel préparatoire aux examens de chirurgien-dentiste. Rédigé suivant le programme de la Faculté de Médecine de Paris et suivi d'un questionnaire. Par., 1897, Société d'éditions scientifiques, 338 p. 24°.

**Pourtier** (Amable-Alexis.) De quelques particularités que présentent les résultats élvignés des amputations de cuisse et de jambe. Par., 1897, Henri Jouve, 50 p. 8°. No. 222.*

**Roy** (Maurice.) Thérapeutique de la bouche et des dents. Hygiène buccale et anesthésie dentaire. Par., 1897, J. B. Baillière et fils, 286 p. 24°.

**Verger** (Théodore-Paul-Henri.) Des anesthésies consecutives aux lésions de la zone motrice. Bordeaux, 1897, Y. Cadoret, 88 p., 1 l. 8°. No. 89.*

**Vidal** (E.-Etienne.) Influence de l'anesthesie chloroformique sur les phénomenes chimiques de l'organisme. Recherches experimentales. Par., 1897, Henri Charles-Lavauzelle, 200 p. 8°. No. 221.*

**Vidaud de Pomerait** (J.-E.) Traitement des fractures simples de jambe par la méthode ambulatoire. Par., 1897, Paul Delmar, 59 p. 8°. No. 625.*

---

**Ambler** (H. L.) Bactericīdal action of electricity. Ohio Dent. J., Toledo, 1897, xvii, 562–569. ——— Tin as a tooth filler. Dental Brief, Phila., 1897, ii, 264–266.—**Amoedo** (O.) Contribución al estudio de la corrección del prognatismo. Rev. méd. de Chile, Sant. de Chile, 1897, xxv, 189–196.—**Andrews** (R. R.) Dr. G. V. Black's conclusions reviewed. Internat. Dent. J., Phila., 1897, xviii, 785–788.—**Arrington** (B. F.) Pyorrhea-alveolaris or Rigg's disease. Items Interest, N. Y., 1897, xix, 897–902.—**Baker** (A. W. W.) The microscope and its relation to dental surgery. J. Brit. Dent. Ass., Lond., 1897, xviii, 690–693.—**Barnes** (H.) Dr. L. P. Bethel's method as applied to the treatment of root canals with alveolar abscess. Items Interest, N. Y., 1897, xix, 915.—**Barrett** (W. C.) Anatomy, pathology and surgery. Dental Cosmos, Phila., 1897, xxxix, 992–998.—**Bartha** (G.) Carcinoma buccæ 1. sin.; kürtas; plastika. [. . . . extirpation; plastic.] Orvosi hetil., Budapest, 1897, xli, 553–555.—**Beckmann**. Rachenmandel und Ohr. Arch. f. Ohrenh., Leipz., 1897, xliii, 179–181.—**Bennett** (F. J.) Concerning the expansion and the closure of the dentinal tubes. J. Brit. Dent. Ass., Lond., 1897, xviii, 694–697.—**Bezold**. Sechs weitere Fälle von Labyrinthnekrose und Facialisparalyse. Arch. f. Ohrenh., Leipz., 1897, xliii, 184–186.—**Black** (G. V.) Answer to a criticism on my methods. Dental Digest, Chicago, 1897, iii, 589.—**Bloch** (E.) Die Krankheiten der Gaumenmandeln. Handb. d. Laryngol.

u. Rhinol., Wien, 1896–7, ii, 548–576.—**Bogue** (E. A.) Dr. G. V. Black's conclusions reviewed. Internat. Dent. J., Phila., 1897, xviii, 812–814.—**Brophy** (T. W.) A case of antral disease involving the frontal sinus. Dental Cosmos, Phila., 1897, xxxix, 998–1000. ——— Report of a case verifying the statement first made by Dr. M. H. Cryer, showing direct communication of the frontal sinus with the antrum of Highmore. Dental Reg., Cincin., 1897, li, 573.—**Bruck.** Angeborene Defecte des harten und weichen Gaumens. Deutsche Monatschr. f. Zahnh., Leipz., 1897, xv, 488.—**Buck** (A. H.) Non-operative treatment of chronic suppurative disease of the antrum and vault of the tympanum. Brit. M. J., Lond., 1897, ii, 1563.—**Busch.** Ueber Verschmelzung und Verwachsung der Zähne des Milchgebisses und des bleibenden Gebisses. Deutsche Monatschr. f. Zahnh., Leipz., 1897, xv, 469–486.—**Buxton** (D. W.) The employment of chloroform for dental operations. Brit. J. Dent. Sc., Lond., 1897, xl, 961–971. ——— An oration on empiricism or science? Anæsthetics, 1847–1897. Lancet, Lond., 1897, ii, 1369–1376.—**Carstairs** (J. L.) Respiratory obstruction due to elongated uvula in chloroform administration. Brit. M. J., Lond., 1897, ii, 1499.—**Case** (C. S.) Principles of force and anchorage in the movement of teeth. Dental Cosmos, Phila., 1897, xxxix, 1011–1024. ——— *Also:* Ohio Dent. J., Toledo, 1897, xvii, 570–582.—**Chamberlain** (W. A.) Eruption of the deciduous teeth. Dental J., Ann Arbor, 1898, vii, 7–10.—**Cobb** (F. C.) Acute inflammation of the antrum of Highmore. Boston M. & S. J., 1897, cxxxvii, 594–596. [Discussion], 603.—**Constant** (T. E.) Salivary calculus in the parotid duct causing symptoms simulating alveolar abscess. J. Brit. Dent. Ass., Lond., 1897, xviii, 701.—**Coulliaux** (L.) Anatomie, Physiologie, Pathologie der Zahnpulpa (des Menschen). Cor.-Bl. f. Zahnärzte, Berl., 1897, xxvi, 306–323.—**Crutchfield** (E. L.) Some peculiar effects of chloroform, with prefatory remarks. Gaillard's M. J., N. Y., 1897, lvii, 344–348.—**Davenport** (W. S.) Regulating without extraction versus extraction for regulating; some typical comparative results. Internat. Dent. J., Phila., 1897, xviii, 777–781.—**Delavan** (D. B.) Tertiary ulceration simulating sarcoma of the tonsil. N. York M. J., 1897, lxvi, 769–771.—**Delbastaille.** Anthrax de la lévre supérièure suivi de mort rapide. Ann. Soc. méd.-chir. de Liége, 1897, xxxvi, 487–492.—**Dolamore** (W. H.) Immediate torsion of teeth, with notes of cases. Dental Rec., Lond., 1897, xvii, 489–496.—**Ducor** (P.) Contribution à l'étude de l'actinomycose en France. Bull. Acad. de méd., Par., 1897, 3. s., xxxviii, 494–496.—**Duplay** (S.) Grenouillette sublinguale. Gaz. hebd. de méd., Par., 1897, n. s., ii, 1108–1111.—**Evans** (Thomas W.) [1823–1897.] (Obituary.) Dental Cosmos, Phila., 1897, xxxix, 1055. ——— *Also:* Dental Rev., Chicago, 1897, xi, 963. ——— *Also:* Internat. Dent. J., Phila., 1897, xviii, 841–844.—**Farlow** (J. W.) A case of subglottic fibroma; removal by tracheotomy and curetting. N. York M. J., 1897, lxvi, 794–796.—**Féré** (C.) Note sur le réflexe pharyngien chez les épileptiques. Compt. rend. Soc. de biol., Par., 1897, 10. s., iv, 967.—**Fillebrown** (T.) Continued study of the relations of the frontal sinus to the antrum. Dental Cosmos, Phila., 1897, xxxix, 1004.—**Finley** (M. F.) Opening the bite with cap-fillings, without destroying the vitality of the pulps of the teeth. *Ibid:* 989–992. ——— *Also:* Dental Digest, Chicago, 1897, iii, 685–689.—**Foster** (H.) Report of a case of uvulitis. Ann. Otol., Rhinol. & Laryngol., St. Louis, 1897, vi, 417.—**Fröhlich.** Oberkieferresection. Berl. klin. Wchnschr., 1897, xxxiv, 1062.—**Gebert** (A.) Bei der Geburt durchgebrochene Zähne. Arch. f. Kinderh., Stuttg., 1897, xxiv, 88–94.—**Gevaert.** Les varices de la base de la langue. Belgique méd., Gand-Haarlem, 1897, ii, 609–611.—**Girard.** Résection du maxillaire supérieur, sans ouverture de la cavité buccale. Rev. de chir., Par., 1897, xvii, 1009.—**Goddard** (C. L.) The canine teeth in comparative anatomy. Pacific Stomatol. Gaz., San Fran., 1897, v, 510–515.—**Godon.** Le service militaire et les dentistes. Odontologie, Par., 1897, 2. s., v, 345–349.—**Godon** (C.) Die Zahnheilkunde in Frankreich. J. f. Zahnheilk., Berl., 1897, xii, No. 40.—**Gottstein** (J.) **und R. Kayser.** Die Krankheiten der Rachentonsille. Handb. d. Laryngol. u. Rhinol., Wien, 1896–7, ii, 496–547.—**Gouley** (J. W. S.) Osteosarcoma of jaw; no recurrence in the mouths after excision. N. York M. J., 1897, lxvi, 811.—**Griffith** (W. F.) The claim of ancient dentistry. Items Interest, N. Y., 1897, xix, 908–912.—**Guptill** (A. E.) Faculties *versus* examiners. Dental Cosmos, Phila., 1897, xxxix, 1024–1026.—**Halász** (H.) A sinus maxillaris savós megbetegedése. [Serous disease of the sinus maxillaris.] Gyógyászat, Budapest, 1897, xxvii, 704–706.—**Hall** (J. S.) [A case of death under chloroform.] Brit. M. J., Lond., 1897, ii, 1591.—**Halstead** (A. E.) Removal of the Gasserian ganglion for the relief of trifacial neuralgia, with report of a case. Chicago M. Recorder, 1897, xiii, 389–406. [Discussion], 455–462.—**Harding** (W. E.) Inaugural address. Brit. J. Dent. Sc., Lond., 1897, xl, 1057–1062.—**Hartt** (C. F.) Der relative Werth verschiedener Zahnfüllungsmaterialien. J. f. Zahnheilk., Berl., 1897, xii, No. 41.—**Herdman** (W. J.) Electricity in dentistry. Dental J., Ann Arbor, 1898, vii, 1–6.—**Heymann** (P.) Verengerungen und Verwachsungen des Rachens und des Nasenrachenraumes. Handb. d. Laryngol. u. Rhinol., Wien., 1896–7, ii, 481–486.—**Hiatt** (N. W.) Improved porcelain crowns. Dental Rev., Chicago, 1897, xi, 926–928.—**Hill** (J.) **and H. L. Barnard.** Chloroform and the heart. Brit. M. J., Lond., 1897, ii, 1496–1498.—**Hirsch** (W.) Notes on a case of traumatic injury of the pneumogastric, hypoglossal, and sympathetic nerves. N. York M. J., 1897, lxvi, 789–794.—**Hoff** (N. S.) Dental analgesics. Dental Rev., Chicago, 1897, xi, 893–908.—**Hopkins** (F. E.) Adenoids and hypertrophied tonsils in children. N. York M. J., 1897, lxvi, 832–837.—**Horne** (W. J.) **and M. Yearsley.** Eucaine as a local anæsthetic in the surgery of the throat, nose, and ear. Brit. M. J., Lond., 1897, ii, 1560–1562.—**Jamison** (T. M.) A simple treatment for alveolar abscess, with fistulous opening. Items Interest, N. Y., 1897, xix, 913.—**Jeanne** (A.) Epithélioma interstitiel de la partie antérieure de la moitié droite de la langue, etc. Bull. Soc. anat. de Par., 1897, lxxii, 684.—**Johnson** (H. H.) Death from hemorrhage after tooth extraction. Am. Dent. Weekly, Atlanta, 1897, i, 163.—**Jonas.** Die erworbenen Defecte des Gaumens und der Kiefer. Deutsche Monatschr. f. Zahnh., Leipz., 1897, xv, 491.—**Kaufmann** (D.) A case of homolateral, acute affection of the auditory, facial, and trigeminal nerves. Arch. Otol., N. Y., 1897, xxvi, 392–396.—**Kayser** (R.) Die Krankheiten des lymphatischen Rachenringes. Handb. d. Laryngol. u. Rhinol., Wien, 1896–7, ii, 487–495.—**Kemp** (G. T.) Nitrous oxide anæsthesia. Brit. M. J., Lond., 1897, ii, 1480–1483.—**Kennerly** (J. H.) Dental prosthesis. Dental Digest, Chicago, 1897, iii, 690–692.—**Körner** (O.) On tympanic neuralgia in connection with abscess of the tongue; report of a case. Arch. Otol., N. Y., 1897, xxvi, 410.—**Kopka** (P.) Ueber die Bedeutung behinderter Nasenatmung und die Nachteile eines offenen Mundes. Bl. f. Taubst.-Bild., Berl., 1897, x, 333; 342.—**Kraus** (F.) Die Erkrankungen der Mundhöhle. Spec. Path. u. Therap., . . . . Nothnagel, Wien, 1897, xvi, pt. 1, i; 259.—**Larned** (E. R.) Excision of the tonsils for hypertrophy with recurring tonsillitis. J. Am. M. Ass., Chicago, 1897, xxix, 1272.—**Lawshe** (A. E.) The prosthesis of entire dentures with countersunk-pin teeth of the vulcanite base. Dental Cosmos, Phila., 1897, xxxix, 1008–1011.—**Lepkowski** (W.) Ueber die Gefässverteilung in den Zahnen von Säugetieren. Anat. Hefte, Wiesb., 1897, viii, 559–588, 7 pl.—**van Leyden** (F.) Ein geheilter Fall von Sarcom des Nasenrachenraumes. Monatschr. f. Ohrenh., Berl., 1897, xxxi, 456.—**Luckett** (W. H.) A ten years' record of anesthesia at Mt. Sinai Hospital, New York. Med. News, N. Y., 1897, lxxi, 770.—**McBurney** (C.) A case of carcinoma of the tonsil. Med. Rec., N. Y., 1897, lii, 893.—**Maduro** (M. L.) A new method of general anesthesia. Med. News, N. Y., 1897, lxxi, 683.—**Martinier** (P.) Clinique de prothese; examen et préparation de la bouche. Odontologie, Par., 1897, 2 s., v, 322–327.—**Maxfield** (G. A.) Dr. G. V. Black's conclusions reviewed. Internat Dent. J., Phila., 1897, xviii, 807–811.—**Mayer** (J. A.) [1837–1897.] (Obituary.) Dental Cosmos, Phila., 1897, xxxix, 1054.—**Meltzer** (S. J.) On the closure of the glottis during the act of deglutition. Brit. M. J., Lond., 1897, ii, 1483.—**Metcalf** (F. H.) Dental jurisprudence. Pacific Stomatol. Gaz., San Fran., 1897, v, 493–503.—**Mills** (W. A.) Pathologic conditions of the pharynx and contiguous structures during early childhood; prime factors in the etiology of malformed maxillæ and irregular teeth. Dental Digest, Chicago, 1897, iii, 700.—**Moeser** (E.) Durchsichtige Glasfüllungen. Deutsche Monatschr. f. Zahnh., Leipz., 1897, xv, 487.—**Montgomery** (D. W.) Chancre of the lip probably acquired through the use of a "rouge stick." Med. News, N. Y., 1897, lxxi, 730.—**Moore** (H. W.) The application of the electric railroad current to dental use. Pacific Stomatol. Gaz., San Fran., 1897, v, 503–510, 1 pl.—**Morrison** (Wm. N.) [—— 1897.] (Obituary.) Dental Cosmos, Phila., 1897, xxxix, 1054.—**Moury** (G.) Fracture double du maxillaire inférieur traiteé par un appareil nouveau. Clinique, Brux., 1897, xi, 729–734.—**Mracek.** Syphilisansteckung in der Mundhöhle. Spec. Path. u. Therap., . . . . Nothnagel, Wien, 1897, xvi, pt. 1, 247–259.—**Murier** (V. M.) Treatment of pulpless teeth. Dominion Dent. J., Toronto, 1897, ix, 423–425.—**Newkirk** (G.) Shok. Cor.-Bl. f. Zahnärzte, Berl., 1897, xxvi, 324–329.—**Olyntho.** Mal de Riga (papilloma sub-lingual infantil). Tribuna med., Rio de Jan., 1897, iii, 424–427.—**Oppenheimer** (S.) A study of the nares and pharynx in a case of hæmophilia. N. York M. J., 1897, lxvi, 767; 802.—**Ortopedia** dental efectuada quirurgecamente. Rev. dent. amer., Phila., 1897, v, 182–186.—**Palmer** (S. B.) Combination fillings of gold and cement. Ohio Dent. J., Toledo, 1897, xvii, 555–557. —— Dr. G. V. Black's conclusions reviewed. Internat. Dent. J., Phila., 1897, xviii, 789–796.—**Parker** (J. P.) Bleaching devitalized teeth with pyrozone. Pacific Stomatol. Gaz., San Fran., 1897, v, 481–486.—**Parklyn** (H. A.) Suggestion in its relation to dentistry. Dental Rev., Chicago, 1897, xi, 914–922.—**Payne** (C.) The evolution of gold crowns. Pacific Stomatol. Gaz., San Fran., 1897, v, 486–493.—**Payne** (R. E.) Replantation in pyorrhea alveolaris, with description of a method for correcting malposed teeth and splinting loose teeth in position until firm. Dental Cosmos, Phila., 1897, xxxix, 1005–1008.—**Peirce** (C. N.) Structural development. *Ibid.:* 1000–1003.—**Pendl** (F.) Ueber ein congenitales Rhabdomyom der Zunge. Ztschr. f. Heilk., Berl., 1897, xviii, 457–468, 1 pl.—**Powell** (A.) The administration of chloroform with $CO_2$. Brit. M. J., Lond., 1897, ii, 1479.—**Price** (W. A.) Phenomena of cataphoresis. Ohio Dent. J., Toledo, 1897, xvii, 582–589. —— *Also, translation:* J. f. Zahnheilk., Berl., 1897, xii, No. 42.—**Radestock.** Zur Narkosenfrage. Therap. Monatsh., Berl., 1897, xi, 593.—**Raymond** (G. A.) Treatment of congenital cleft palate by mechanism. Boston M. & S. J., 1897, cxxxvii, 596. [Discussion], 600–602.—**Reed** (W. T.) [—— 1897.] (Obituary.) Dental Cosmos, Phila., 1897, xxxix, 1054.—**Reid** (S. T.) A case of chloroform poisoning in which nearly half a grain of strychnine was injected; recovery. Brit. M. J., Lond., 1897, ii, 1498.—**Rhein** (M. L.) Ueber die Behandlung des acuten und chronischen Alveolar-Abscesses. Cor.-Bl. f. Zahnärzte, Berl., 1897, xxvi, 330–336.—**Rickets** (M.) Removal of upper and lower jaws through the mouth without incision. Railway Surg., Chicago., 1897–8, iv, 537.—**Roach** (F. E.) A new method of bridge work. Dental Rev., Chicago, 1897, xi, 922–926.—**Rogers** (F. T.) The relationship of dental irritation to aural disease. Atlantic M. Weekly, Providence, 1897, viii, 389–392.—**Rose** (H.) Dental mechanics. Appliances and devices for the correction of dental irregularities. Brit. J. Dent. Sc., Lond., 1897, xl, 1062–1068.—**S.** (L. D.) Treating wounds in the mouth. Dominion Dent. J., Toronto, 1897, ix, 387.—**Sandusky** (F. R.) A successful method of tipping porcelain facings especially adapted to direct occlusion in crown and bridge work. Items Interest, N. Y., 1897, xix, 914.—**Schreiber** (M.) Geschichte der operativen Kieferklemmentherapie. Cor.-Bl. f. Zahnärzte, Berl., 1897, xxvi, 289–297.—**Schwartz.** Les paralysies post-anesthésiques. Rev. de chir., Par., 1897, xvii, 997.—**Scott** (J. A.) The preparation and colouring of lantern slides suitable for scientific demonstrations. J. Brit. Dent. Ass., Lond., 1897, xviii, 697–701.—**Sehlbach** (A.) Die Geschichte der operativen Behandlung des Zungenkrebses. Memorabilien, Heilbr., 1897, n. F., xvi, 129–132.—**Semi-centenary** of the introduction of chloroform as an anesthetic. Brit. M. J., Lond., 1897, ii, 1585.—**Senn** (N.) Treatment of chronic empyema of the antrum of Highmore by temporary osteoplastic resection of the anterior antral wall. Pacific M. J., San Fran., 1897, xl, 721–724.—**Smith** (B. H.) Dr. G. V. Black's conclusions reviewed. Internat. Dent. J., Phila., 1897, xviii, 814–816.—**Smith** (U. W.) The teeth: their structure and comparative arrangement and uses. Dental J., Ann Arbor, 1898, vii, 10–13.—**Steele** (W. H.) A new method for casting metal dies. Ohio Dent. J., Toledo, 1897, xvii, 553–555.—**Sullivan** (H. H.) Treatment and filling of root-canals. Dental Digest, Chicago, 1897, iii, 695–700.—**Todd** (F. C.) Some points relating the oral cavity to the eye, ear, nose and throat. Dental Rev., Chicago, 1897, xi, 908–914.—**Tomes** (C. S.) Dr. G. V. Black's conclusions reviewed. Internat. Dent. J., Phila., 1897, xviii, 781–785.—**Troisième Congrès** Dentaire National (Session de Paris), 28, 29 et 30 novembre 1897. Odontologie, Par., 1897, 2. s., v, 328–336.—**Trueman** (W. H.) Ancient dentistry. Some errors in Dr. Ledyard's paper corrected. Items Interest, N. Y., 1897, xix, 903–908. —**Truman** (J.) Dr. G. V. Black's and Dr. J. Leon Williams's conclusions reviewed. Internat. Dent. J., Phila., 1897, xviii, 796–807.—**Tutt** (A. M.) Mechanics of bridges. Dental Digest, Chicago, 1897, iii, 692–695.—**Viaud.** Le vertige stomacal et le caféisme. Tribune méd., Par., 1897. 2. s., xxix, 928–930.—**Waller** (A. D.), **Richet** (C.), **Lawrie** (E.), et al. A discussion on anæsthetics, the action of anæsthetics upon nerves; ether and chloroform. Brit. M. J., Lond., 1897, ii, 1469–1479.—**Wedelstaedt** (E. K.) Some advance in the system of measurement. Dental Cosmos, Phila., 1897, xxxix, 981–989.—**Wilkerson** (S. C.) [1839–1897.] (Obituary.) *Ibid:* 1053.—**Wolfe** (A. M.) Dentistry in Russia. Brit. J. Dent. Sc., Lond., 1897, xl, 1068–1073.—**Wolff** (J.) Ueber die Operation der doppelten Hasenscharte mit rüsselartig prominirendem Zwischenkeifer und Wolfsrachen. Berl. klin.-Wchnschr., 1897, xxxiv, 1021–1024.—**Woodley** (Joseph R.) [—— 1897.] In Memoriam by W. W. H. Thackston. Dental Cosmos, Phila., 1897, xxxix, 1052. —**Zander** (R.) Ueber das Verbreitungsgebiet der Gefühls- und Geschmacksnerven in der Zungenschleimhaut. Anat. Anz., Jena, 1897, xiv, 131–145.

# LIST OF UNITED STATES PATENTS

## PERTAINING OR APPLICABLE TO DENTISTRY

### ISSUED DURING DECEMBER, 1897.

*December 7.*—No. 594,952, to F. F. Hoyer. Dental tool-guard.
" " No. 595,068, to W. T. Lyon. Dental appliance.
" *14.*—No. 595,301, to Chas. D. Grundy. Dental apparatus.
" " No. 595,532, to D. S. Doyle. Dental cuspidor.
" " No. 595,533, to D. S. Doyle. Dental cuspidor.
" *21.*—No. 595,898, to F. E. Whipple and C. A. Stauffer. Electric motor.
" " No. 596,022, to D. L. Aber. Dentometer.
" *28.*—No. 596,254, to Geo. W. Watson. Dental disk-holder.
" " No. 596,450, to F. S. Allen. Tooth-brush.

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# ORIGINAL COMMUNICATIONS.

## A METHOD OF INSERTING GOLD FILLINGS WITH THE USE OF HAND BURNISHERS, AS PRACTICED EXCLUSIVELY FOR TWENTY YEARS.

BY DR. HENRY F. LIBBY, BOSTON, MASS.

ON December 5, 1894, the president of the Academy of Dental Science of Boston, Mass., asked me to read a paper before its members relating to a method of inserting gold fillings by burnishing or rubbing one fold of gold on another until a cavity is filled. The paper was based on an experience of seventeen years' exclusive use of this system. During this period I watched with interest the trend of the various undertakings of eminent men who have attempted to make the method of filling teeth with smooth points and rotating devices a success, at the same time earnestly studying the failures and successes that followed, year after year, my own experiments with new designs of burnishing instruments, and have been encouraged by finding that each new set marked an epoch of progress in the history of the method.

Since the first paper was published, it has been my pleasure to explain the method to many dentists. Dental societies, desirous of learning more about it, have urged me to give clinics and read papers detailing more explicitly the theory and its application; but I did not deem it wise to try to increase the numbers of those who had already adopted the method in my immediate vicinity, fearing that, though I had mastered the use of this form of operating to good purpose, it would not be universally practical. So I have asked most earnest inquirers to be patient until the theory could be demonstrated by actual proof, and its simplicity and success be assured.

However, although the short-shanked instruments were not fully matured, I was convinced ten years ago of the soundness of the method in every particular.

Before going further, let me say, in a few words, that I think all the difficulty has been centered in the instruments. It has been said, "It is not the instrument, but the man, who makes success." It is obvious that instrument and man are inseparable. Yet if we look through the mechanical industries to-day we do find that we have to make some distinction. Instruments, in every department of mechanics, are assuming a primary importance, while man guides. My wish for the moment is to insist on the importance of the instrument.

A portion of the instruments are shown in Fig. 1. These comprise the full set that are used in this method of working. The first four are non-cohesive gold pluggers used for packing at the cervical wall, direct pressure. Between the lines across the points of the others, are shown the burnishing or rubbing surfaces. It is only within a few years that I have held strictly to the present pattern. Let me give in detail an abbreviated description of those used in the experimental work of twenty years.

My first set were Varney pluggers, with the serrations removed on the obtuse foot and a shorter-foot plugger. These I could manipulate with greater freedom in the incisors and cuspids than other shapes, using the back of the points as well as the face. It was surprising how attached I became to this pair of points, and should probably have been operating with them to-day had I not discovered their incapacity for finer work. Possibly this liking for the Varney pluggers arose from the fact that rapidly increasing confidence in the burnishing process began with these instruments.

With them began my devotion to this method, which gave me such anxiety that I shall never forget its burden. Relief came when my patients' semi-annual and annual visits rewarded me with few failures. Where were these failures? At the cervical borders, for the reason that the instruments were ill adapted to reach this most vital spot. The handles were too delicate to be held with sufficient strength for condensing the gold properly. The impact was feeble. It was not that the gold would cleave and not cohere. The failures, I was convinced, were due to the instruments. Therefore, I purchased the Harvard set. Then I began the use of the corkscrew form of points for burnishing, which led up to more improved forms and proved to be the most useful.

The fillings of the incisors and cuspids immediately began to improve after these instruments were introduced, which was evidence to my mind that the corkscrew form was an advance in the filling of these particular cavities. Then failures appeared at the cervical walls of the bicuspids and molars; the same unfortunate conditions existed here as with the Varney points,—the inadequateness of the instruments to reach the deep distal and mesial cavities of these last-named teeth; also, the same difficulties remained in the handles. I felt the necessity of getting more purchase near the point, and thereupon the idea came of short-shanked instruments. It was then I began to make patterns of instruments and shapes of handles as my experience seemed to demand.

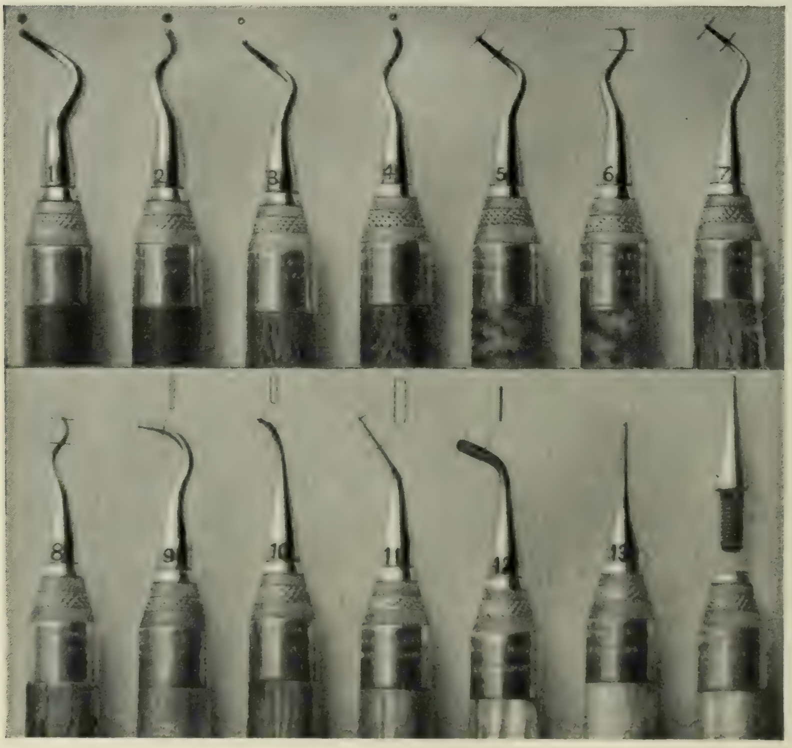
The next set had large steel handles, which were needlessly heavy, with tapering short shanks. These were an improvement on the Harvard. I operated with these for four years, using right- and obtuse-angled points. The length of the point was five-sixteenths of an inch; the point surface, one-sixteenth of an inch. With these I could pack soft foil with direct pressure at the cervical wall in the bicuspids and molars, completing the fillings by burnishing with a longer pair of corkscrew points, Hopkins design.

With these instruments I was able to reach any desired depth, contouring with two flat obtuse burnishers. At that time I had had an experience of nine years with this method. My success was established, as far as solidity and cohesion of gold by burnishing was concerned, even under the difficulties that pursued me from imperfect instruments. However, I could not get close enough to my working point, even with this set, without great fatigue to the hand, and I saw the necessity of handles larger near the points. These were not practical in steel, and I thought of wooden ones. The matter of wooden handles and sockets is old to the profession, my modifications simply being the shortening of the points and the shaping of the handles to suit the need.

The most important features of the next set were wooden handles, with the introduction of very long, well-curved corkscrew points, varying in size. With the largest of these I was able to pack with ease and satisfaction soft foil at the cervical walls of molars and bicuspids. My success in arresting decay at this most vulnerable point with these instruments was assured after a test of four years. However, I was not satisfied with the handles of this set, which were hexagonal; nor with the points, which could, I thought, be shortened still more to advantage. I found, during these experiments with handles, that a sensitive touch, firmness in grasp, and accuracy in manipulation increased in proportion as I enlarged them. For instance, grasp your lead-pencil with the whole hand (overlooking the fact that it is a trifle too small), and you will feel a sense of power as well as of delicacy. Shall we, then, go on enlarging the size of the handles? I think not. The limit is reached when the cushions of the fingers can no longer vibrate in immediate contact with other portions of the hand.

In Fig. 1 the points of the instruments I use to-day are shown in their correct form and size. The handles are wood, which is pleasant to hold, light, and subdues the vibratory sound of steel, both against the teeth and on the cabinet. I am adopting them for both excavators and gold-trimmers. By its use I am enabled to employ colors, which assist in quickly recognizing the points desired when they are thrown on a bracket promiscuously, instead of tiring the eye in searching for the smaller object,—the point. Please note, also, that the butts of the handles point out at a glance the right from the left, and this simple aid assists materially in relieving the eyes. I have searched carefully to get distinct colors, and out of all the varieties of natural wood have been able to secure only nine. Those at the right are ebony, then mora, leopard, cocabola. These are in pairs. The single ones are redwood, cedar, mahogany, sycamore, and white holly; the last five, having the same-shaped butts, are to be caught with the eye by the color only.

FIG. 1.



The cone-shaped ferrule that receives the point is a solid piece of metal, so shaped as to form a ferrule over the end of the wood, and to extend for an inch and a half down the handle. This ferrule receives the point on a screw-thread, which, when screwed in firmly, I have never known to turn during an operation.

Before entering into the particular service of each point in the set, let me call your attention to a geometrical principle that applies in shaping cavities, and that, with few exceptions, holds good in this method of work. (Fig. 2.) These cuts are selected from Dr. Ottolengui's and Dr. George Evans's methods of forming cavities. In these you observe that all the cavities and their retaining surfaces represent spheres or parts of spheres. This is true to the order of natural law for obtaining the greatest mechanical strength. If we should take any normal tooth and divide it into sections, and continue its curves, we should form spheroidal shapes. In Fig. 3 the corkscrew point likewise forms, by the continuation of its peripheral curve, a sphere; the small circle that you see represents some arc of the point-curvatures. For obtaining retaining grooves the round or sphere-shaped bur is used exclusively. Here we have three co-sphered forms that correspond to each other and coalesce strongly and practically.

FIG. 2.

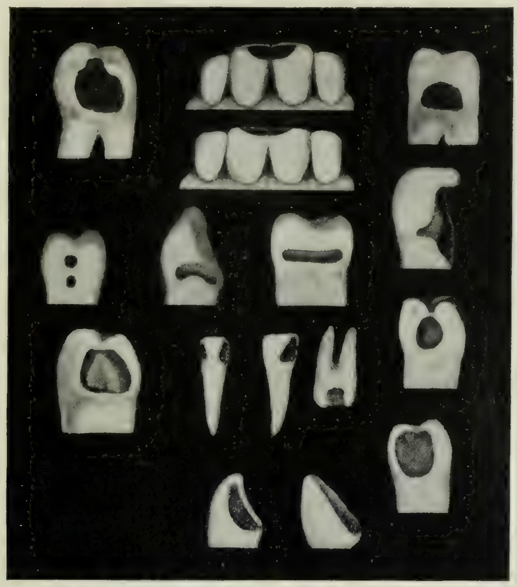
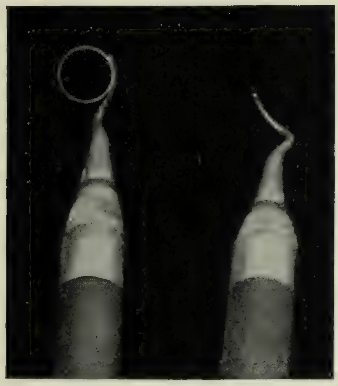
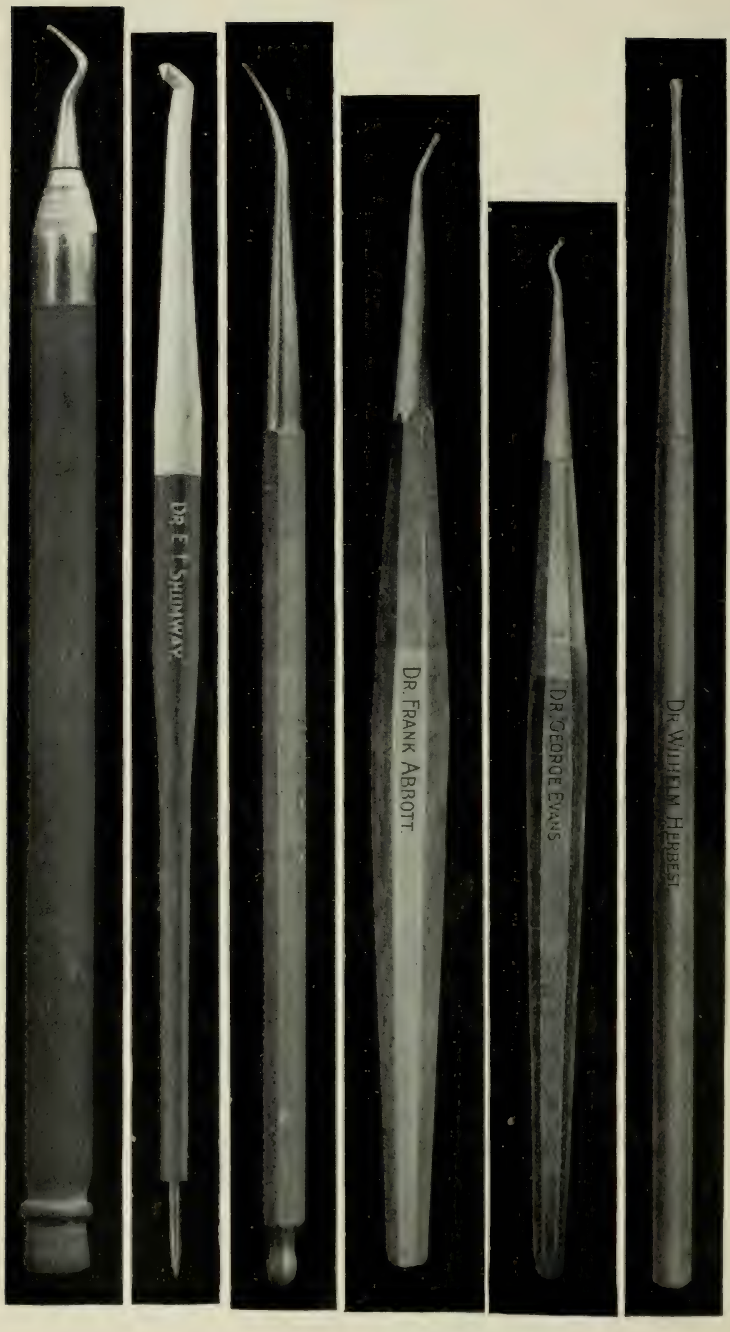


FIG. 3.



In Fig. 4 are seen some of the leading pluggers that are used

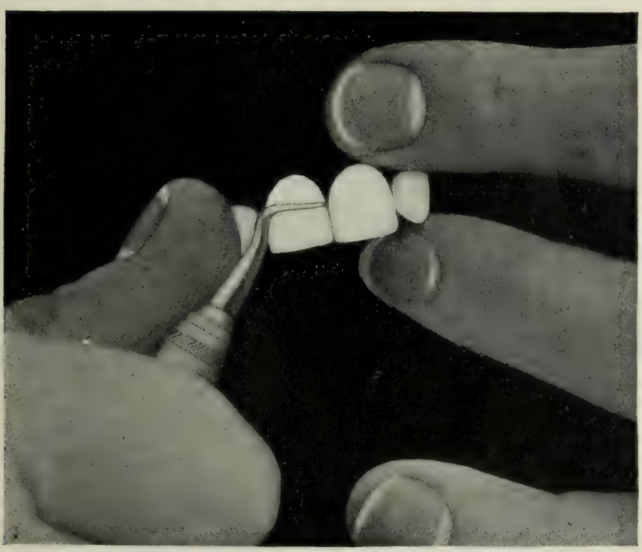
FIG. 4.


DR E L SHUMWAY
DR. FRANK ABBOTT.
DR. GEORGE EVANS
DR. WILHELM HERBST

to-day, and you will observe that some of these forms have been used in the attempt to perfect this method of work. The handles are those of Dr. Wilhelm Herbst's hand instruments, Dr. D. T. Shumway's ivory points, Dr. George Evans's, Dr. Frank Abbott's, and of the Harvard pluggers. But I fail to find them suitable, as they are not adapted for firm grasping either by the fingers or by the full hand.

Fig. 5 illustrates what is meant by a "full-hand" grasp. The whole hand grips the handle near the point, so near that the thumb may steady the pressure by bearing always on adjacent teeth. I am convinced that a handle should be so constructed that the cushions of the fingers touch the palm, thus adding the advantage of sensitiveness to that of strength. This is one of the advantages of the short-shanked points. Another is the unyielding rigidity of the short taper, which lessens the danger of slipping. I cannot but think that gold would have been molded into cavities and condensed after this manner years ago, if there had been instruments properly constructed. Moreover, with this present form there is little danger of fatiguing the hand during the operation.

FIG. 5.



Having now considered the instruments, let us proceed to an operation on the upper right first and second bicuspids. The rubber-dam is in place. Fig. 6 shows the teeth in the normal position. The treatment that these teeth receive is performed on all the approximal surfaces of the molars and bicuspids, both on the upper and lower jaws; also on the distal surfaces of the cuspids. A faint color of disorganized enamel and dentin beneath the occlusal surface suggests diseased tissue. For years I have separated these teeth mechanically. To-day, with a few exceptions, I do not. For years I opened one side of the occlusal surface, and filled the opposite, when the cavities were minute, by leaving a good, healthy enamel occlusal surface wall. My failures were inevitably on the tooth that was not cut to the surface, as in Fig. 7. I had ninety per cent. more failures the first twelve years, when separating mechanically, than during the last eight years, when cutting sufficiently to contour the gold surfaces. These are important facts. When the teeth are separated mechanically, the danger lies in cutting too little. Then, when the teeth return to their normal position, the enamel marginal walls touch instead of the gold surfaces.

Fig. 8 represents the teeth with the cavities prepared by cutting away the enamel-walls sufficiently for contouring. If the cavities are ever so minute, ever so high up toward the gum-border, I do not hesitate to bring them freely to the surface if gold is to be used. During eight years I have been experimenting and leading up to this. If the photographs had given us a better interior view of the cavities we could discern a groove passing down each side of the cavity, nearly to the base-line or cervical wall. I never carry this groove along the cervical wall or bottom of the cavity, for where this is done, if there is any enamel left it would be vitally endangered by the cutting away of the supporting dentin; also, at this portion of the tooth, the body of the pulp is in close proximity.

FIG. 6.

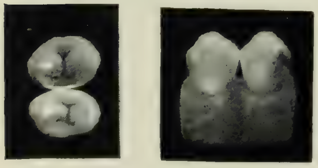


FIG. 7.

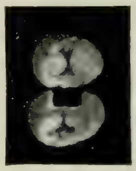


FIG. 8.

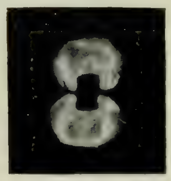


Fig. 9 shows the thickness of the enamel where the transverse section is cut, and the greatest width of the pulp-chamber. This same figure shows with what freedom the groove can be made by following up the walls or sides with a No. 1 round bur, which for years I have used regularly for this purpose. I have been asked why I did not use an inverted cone bur. In the enlarged drawing of Fig. 10 there are placed within the enamel-border the round and inverted cone burs, drawn to show the advantage and disadvantage of each. The danger of cutting with an inverted cone having sharp angles is clearly in reducing the dentin and thus weakening the enamel-walls. Furthermore, the inverted cone bur does not leave as smooth a surface, nor can it be held so gently and firmly as the round one. With the round bur referred to one can safely make these grooves, leading from near the bottom of the cavity to the top, leaving the dentin, which is of vital importance for support.

The enamel-walls are cut with respect to their natural line of cleavage. The cervical enamel, if there is any left after removing the diseased dentinal tissue, is free from a chalky appearance, or that delicate white line which is a danger-signal to the operator and inevitably goes down to healthy dentin. This will usually leave a comparatively straight or slightly diverging outward cervical wall. To show the reason for preparing cavities in this way, I will refer to Fig. 11, in which I trace the progress of decay after it has penetrated the enamel. The micro-organisms naturally follow the channels of the tubuli or dentinal fiber, and make as rapid headway along these pathways as the healthy resistive forces of the pulp will allow. This is not as rapid, however, as is made laterally, particularly where the interlacing net-work or interzonal layer of the terminal branches of the fiber comes in contact with the enamel barrier in this part of the tooth. The ravages of the micro-organisms extend in every direction, and the farther they are removed from the vital center, the pulp, the easier the conquest. My object in drawing this picture is to show the importance of making these grooves, as one means of removing every vestige of disease that penetrates upward to the pinnacle of the dentin in the cusps.

FIG. 9.

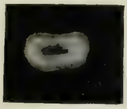


FIG. 10.

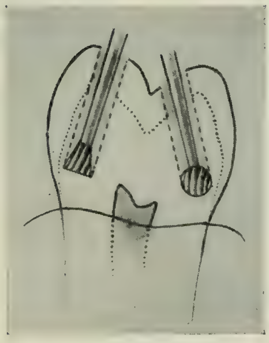


FIG. 11.

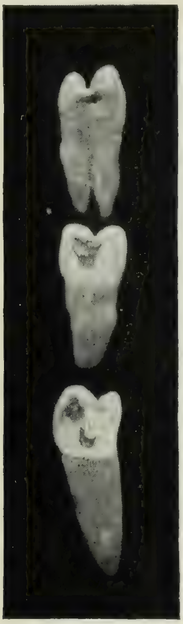
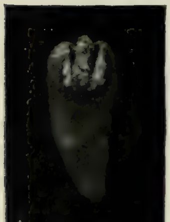


Fig. 11, cut 1, shows where the decay entered the enamel. Cut 2 represents the enamel and dentin, ground off laterally to within a safe distance of the pulp. The dark shade clearly shows that these micro-organisms did not reach the pulp-chamber, but rather worked away from it. Cut 3 shows a slight discoloration toward the pulp-cavity, which is exposed, and the distinctive action is more pronounced at the point of the dentin most distant from the pulp. It will be observed that these grooves are well back in the solid portion of the cusps, and it is the experience of actual practice that we rarely get beyond the diseased dentin. In this manner of preparing the cavity we have removed overhanging, unsupported enamel-walls that are practically worthless as masticating or retaining surfaces. We have left no enamel to disintegrate during the operation; we have left none to crush during the service the teeth are to render in after-years. We have opened a free entrance to the cavity with comparatively little pain to the patient, provided our burs and excavators cut without much pressure; and last, but not least, we have locked the filling where the greatest strength is required. I have been asked if the outer walls have not been weakened by the grooves. I think not, if the cavity has been prepared correctly. There is no enamel left that is not reinforced by dentin, and this additional strength to the enamel cannot well be exaggerated.

FIG. 15.



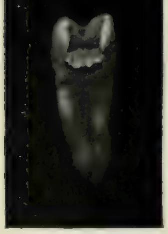


FIG. 12.

FIG. 13.

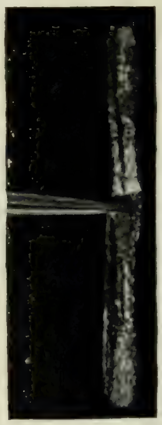
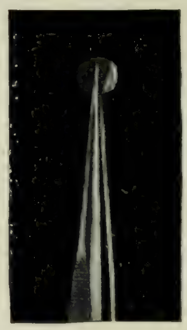


FIG. 14.

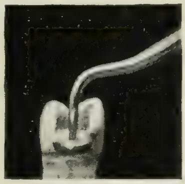


During careful watching of this method for eight years of working I cannot recall any breaking down of these walls when absolutely freed from decay. I do have fillings fail at the approximal border lines from imperfect manipulation and contouring. The decay creeps back beside the neglected wall, which ought to have been cut away more thoroughly.

Fig. 12 shows the mesial surface of a second bicuspid with its cavity prepared and a layer of non-cohesive gold at the base. My object in separating this from the first bicuspid is to show the structure of the filling and the method of working. For at least sixteen years I have used crystalline surface soft gold foil at the cervical wall with success. I have experimented with the smooth surface soft foil of many manufacturers, but do not recommend it. It is a well-known fact that there does not exist any cohesion between cohesive and "soft" foils; it is simply a mechanical union, and I do not get as firm a union with smooth foil as with crystalline. I cannot account for this curious fact.

Each sheet of foil is divided into thirds and rolled in rope form for a cavity of the size just mentioned. From a rope cut off one-third; the remainder may be grasped with a pair of pliers, as in Fig. 13, and rolled between the thumb and forefinger. In withdrawing the pliers the cylinder may be flattened as in Fig. 14. There are cavities that would require two ropes of full length for each cylinder, and these may diminish in size until one-third is used for small cavities. The flattened cylinder shown in Fig. 14 is carried to the cervical wall at one side; by gently pressing, not condensing, it will permanently lodge there; another should be similarly prepared and placed on the other side. The third is likewise rolled, and there will be a wedge-shaped place for it between the other two, as shown in Fig. 15. There are operators who anneal this third piece; I do not feel that it is necessary. The largest-sized corkscrew, number one or two, is then firmly grasped by the full hand. Press, with gently increasing strength, the point against this wedge-shaped piece until it apparently disappears; then condense laterally toward each wall. If the cylinders are sufficiently large, they will not tilt when properly condensed. In Fig. 16 is seen the point and its relative size to the cavity. How well it is adapted to the cavity is obvious. It pushes the material without puncturing it. The deep curvature of the point reaches to the various depths of cavities and gives ample room for the sight. The large surface point packs without danger of disintegration, and the strength that can be used harmlessly and painlessly is marvelous. I have tried over and over again a second layer on this same principle, and failed in making a satisfactory union. Soft foil has a remarkable quality of mobility when continued pressure is brought to bear on a large mass, and the tendency is to slide or tilt later on. With one layer against the cervical wall, we seem to have it under control; and after having condensed it we have a surplus overlapping the walls. Thus far we have protected a vital spot with what is known as the most perfectly adaptable material that exists. We have packed above the danger line, where the enamel tapers to a finish, without a suggestion of a fracture.

FIG. 16.

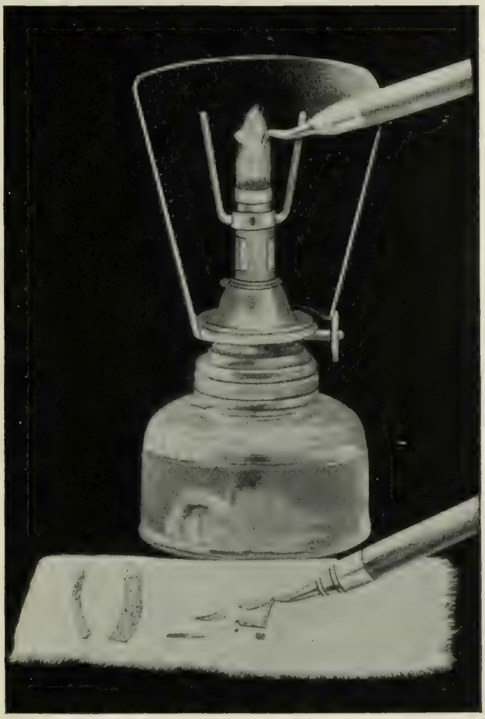


The next treatment begins with cohesive gold. It is interesting to note right here that during seventeen years I have used only one manufacturer's gold, both in soft and cohesive foils, and by this method have been better able to determine the causes of the failures of the first eight years. No. 3 cohesive gold foil was chosen, and by its use I did not need to hesitate to undertake the most difficult contouring, building out lost or broken corners, and covering worn and abraded masticating surfaces. Each sheet was divided into thirds and rolled in rope form. I have tried other foils, and found them satisfactory as far as cohesion was concerned, and firmly believe all cohesive foils, as well as what is claimed as cohesive foil on cylinders, can be used with safety. The mat form I am familiar with. No. 4 foil, prepared in the same manner, may also be used, and possibly numbers ranging higher. I avoid high numbers in small cavities, as it works stiff, and consequently is less adaptable. For the last three years I have used folded gold, No. 40, and am charmed with its cohesive and plastic qualities. I find that a very large majority of the inquirers do not know what is meant by Nos. 30, 40, or 60. I am informed by a manufacturer that if a sheet of No. 4 gold foil is divided into thirds and rolled in rope form, each third has the same weight and thickness as No. 40. In No. 40, then, there are ten folds of foil, loosely laid together. These are the length of ordinary gold foil and about one and one-half inches wide. There is an advantage in this method of preparation, inasmuch as the foil is evenly folded and does not, like the ordinary rope-form foil, melt at the edges when passed through the annealing flame. It has been my habit for many years to flatten the rope form by passing across it a round-handled instrument, and thin edges, not being evenly distributed in thickness, would melt when annealed. This flattening of the rope as well as the cylinders I would suggest to all operators who have not tried it. When flattened in this manner it can be more easily picked up by the point or pliers without injury to its cohesive properties; and when placed at the entrance of the cavity it does not obscure the opening as much as the loose and bulky form. In addition, I consider this has a twofold utility: First, the piece can be taken by either end, and it does make a difference which end is carried to the cavity, particularly if the flat burnisher is used. If the flat point comes between the already condensed gold and the fresh piece, this latter is carried to the upper or lower wall, as the case may be, without touching the gold. By withdrawing the point it laps down on the mass and all goes well. Otherwise, if the gold should touch the mass already in, it coheres, and the mouth of the opening is prematurely stopped. Secondly, *it is positively essential that the point should pass through the flame to prevent the gold from adhering to the point and creating a sticky or abrasive surface, which is very troublesome.* At times I have to hold the point in the flame for a moment to overcome this strange phenomenon. *This fact must not be overlooked or forgotten.*

Now that I have referred to cylinders, I would guard against the use of the larger sizes. Cohesive forms in occlusal cavities, however, when the instrument can be conveniently worked with force and firmness, are safe. I need not suggest caution, as obviously they cohere or they don't. Many operators who use cylinders have been so wedded to them that they do not discard them altogether, but use the smaller sizes. For myself they seem too slow and fussy.

I have called attention to one advantage only in the folded foil, and that in itself was sufficient to attract me to it. Now that I have become acquainted with its more important, soft, elastic, and tough qualities, I would pay a premium, if necessary, to obtain it. In preparing it for ordinary cavities, the ribbon-like bands are cut from a sixteenth to an eighth of an inch in width and from one-half to an inch in length; or, if used full length, they can be managed with ease and rapidity.

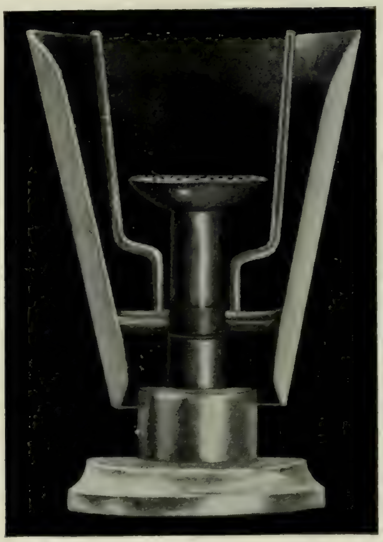
FIG. 17.



The next step toward the cohesive gold work is the annealing lamp. Until within two years I have used a ninety-five per cent. alcohol flame. Fig. 17 represents the construction of the lamp. The shield is blackened on the inside, so that the flame can be seen in a bright light. As an extra precaution in annealing, two diverging wires are placed on each side of the flame as guards between which the gold must pass. I have annealed upon metallic trays with perfect safety, using gas, but never over a Bunsen burner. Professor G. V. Black, in his paper read before the New

York Odontological Society, stated that gold foil possesses the power of condensing or occluding gases and volatile substances upon its surface, and that when such gaseous occlusion took place the welding property was entirely destroyed. Dr. E. C. Kirk, in the "American System of Dentistry," says, "In view of the readiness with which gold foil absorbs gases, the use of a naked flame for annealing gold foil is objectionable, for the reason that the foil is subjected to the action of the products of combustion, which in the case of a Bunsen burner contains, beside the usual water and carbonic acid gas, a greater or less amount of sulfurous anhydrid, and, should the imperfection of the combustion be in any way modified, acetylene and other deleterious hydrocarbons are produced." Notwithstanding the results of these investigations of gas combustion, I have annealed gold over an open water-gas flame for two years without any evil results. The burner that I am at present using was invented by Dr. J. E. Stanton, of Boston, and is manufactured by Codman & Shurtleff, of Boston, and shown in Fig. 18. The flat disk through which the gas escapes is supplied with thirty-six small openings, the size of a No. 2 round bur. I have added to this burner a blackened shield and upright arms, like those shown in the alcohol lamp. If it is the carbon alone that we fear, then the Stanton burner has the preference, as can be shown by a simple experiment. Hold a porcelain slab over the apex of the cone of the alcohol flame the same length of time as over the Stanton flame, in the same position, and there will be found a deposit of carbon on the former and none on the latter. Also, if a piece of gold is held half an inch above the flame

Fig. 18.



of the alcohol or the Stanton lamp for one-half minute, I find that neither is affected by any chemical deposit that prevents the gold from cohering perfectly. The Stanton burner has a very great advantage in the breadth of its flame; and the quiet force of this flame, as it escapes from the burner, enables the operator to pass the gold through it with the point of the burnisher without its being blown off or melting. Whenever a carbon or yellow flame is observed in the Stanton burner, it is evident that the openings need cleansing. This should be done by a brass instrument instead of steel, to prevent enlargement of the openings.

In the January number, 1897, of the *Ohio Dental Journal*, a paper was given on smooth-point pluggers, by C. G. Myers, D.D.S., advocating their practicability. This was very gratifying to me. During the discussion of this paper Dr. J. R. Callahan referred to smooth points with a burnishing motion as giving him satisfactory results. But, he adds, it is absolutely necessary that an electric annealer be used. I have not found this essential. I have experimented with one, and am not convinced that it is practical in economy of time. When it becomes necessary, as it does with the electric annealer, to pick up each piece with a pair of pliers, it becomes worthless to me.

Continuing the operation, I now lay upon the bracket a doily, folded in four thicknesses, which acts as a pad for the picking up of the gold by the point of the instrument, as was shown in Fig. 17. It was also observed that the gold is picked up by one end of the piece and passed through the flame. It has been often asked if this passing of the instrument through the flame does not destroy the temper. My experience teaches that it does not; the point does not bend, but breaks, like other steel points, whenever there is too much pressure brought to bear. To be able to pick up and anneal gold in this manner a roughened or serrated point is required; and to keep the point in good condition I use a serrated file. Drawing it across the point once is sufficient for a long time.

I will refer again to Fig. 16, which shows where the non-cohesive soft foil was packed against the cervical wall by the largest corkscrew points. This was done with the points of the instrument by direct hand pressure. Following this, a small piece of cohesive gold is picked up by the same large point, annealed, and pressed firmly upon the mass, which readily unites by mechanical union, furnished by the serrated point. This is followed by other pieces, until the surface is covered, and still the direct hand pressure may be used, building diagonally against the pulp-wall.

We will now begin the burnishing. *Without referring to Fig. 1, let it be thoroughly understood that the gold cannot be burnished into the cavity by using the points; the rubbing surfaces are the sides of the instruments, as shown in Fig. 19, between the lines.* Fig. 20 shows the position of the corkscrew point (five or six) in the cavity. A drawing motion is usually required in the beginning of rubbing the gold on the mass already there and into the retaining grooves.

This is followed by a lateral or circular motion to keep a smooth surface, if the cavity is large enough to allow. I have to generalize somewhat in explaining. The point is to keep the surface free from ridges, the only objection to which is, that the final finishing is more prolonged. There will be no difficulty in reaching the deepest cavities with these points; and while rubbing into the grooves you are, at the same time, stiffening the soft foil at the cervical wall. With this point, if so desired, the entire cavity could be matured, even to the contouring point. Before reaching this point, however, the process can be hastened by using the flat point, No. 12 (Fig. 21), which will quickly shape the contouring knuckle to any desired proportions.

FIG. 19.

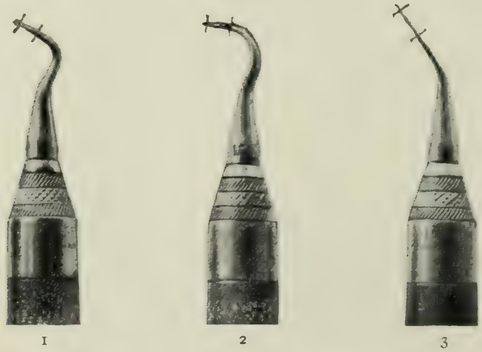
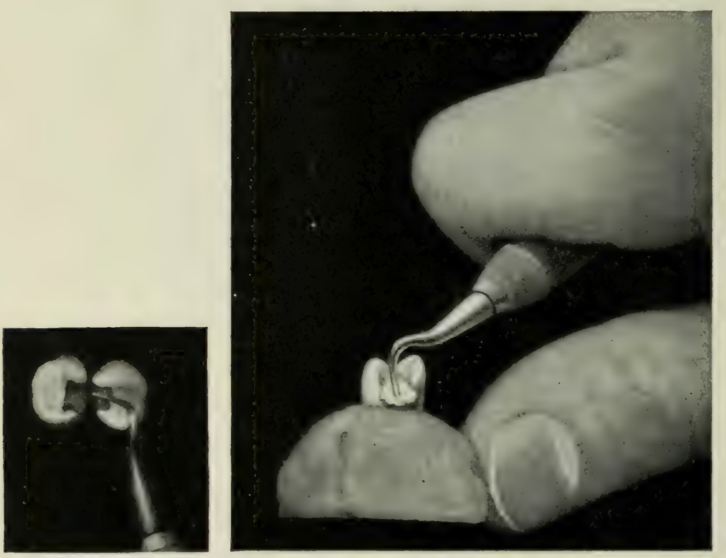


FIG. 20.



There is an advantage in filling the mesial cavity first, as you can work through the opening made in the distal surface, and by the aid of the mouth-mirror you can either stand erect or sit. In this position the instrument is grasped by the full hand. The thumb finds support against the buccal side of the molars, with no inconvenience to the patient. If the cavities are farther back between the molars, the thumb still finds rest along the buccal wall. Here the short-shanked points are wonderfully effective, getting close to the work, and the firm hold on the handle is a safeguard against slipping.

Now let us suppose this cavity filled. The process of finishing is at the option of the dentist. The density of the gold allows any form of finishing that is usually employed for such purpose. And if the case requires, do not hesitate to use finishing burs, corundum or carborundum stones. This leads me to say the density of the gold is in proportion to the strength that has been employed in condensing. This is a broad, unscientific statement, but it answers the purpose from the practical side of the question. I cannot draw the line between the condensed and the uncondensed. By experience I have learned that there are a vast number of degrees of density which can be safely utilized in the preservation of teeth. Adaptability and sufficient strength to resist all the wear that mastication involves should be our aim. I infer that all my readers have packed soft cylinders at the cervical wall. The strength used in rubbing cohesive gold, as I have described it, is hardly one-half of what is required for this. When the surface has a very bright polished appearance, it is dense. To those whom I have instructed the power of condensing has come intuitively, and it is safe to say that the sense of touch will dictate. Rubbing over the surface several times does not disturb its cohesive properties, but it is needless for perfect condensation.

FIG. 21.

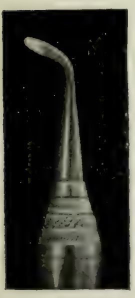


FIG. 22.

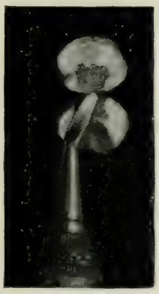


FIG. 23.

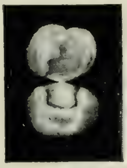
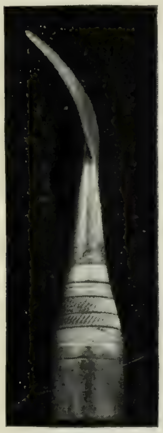


FIG. 24.

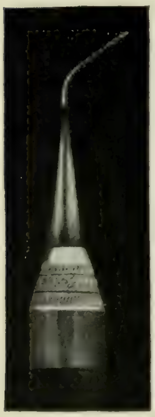


In operating on the adjoining tooth, the same general method is employed until the cohesive portion is built up to the contouring point. Then the obtuse burnisher, No. 11 (Fig. 22), is grasped with the full hand, the gold being picked up by the point and placed with precision, and cohered with such strength that the point of contact can be tapered to any desired shape. With this somewhat flexible instrument the gold packs firmly against the adjacent filling, and has a tendency to force the teeth apart during the contouring. Fig. 23 is an example of what I mean by tapering. The object in shaping the touching points in this manner is to avoid septic conditions; capillary attraction draws the fluid to the point of contact, thus leaving the margins of the fillings free, leaving also less frictional surface for the accumulation of foreign substances. It may be thought that these slightly touching points will break away or cleave off in the silking of the teeth, or by the use of the toothpick. This does not occur. The lasting results produced by this simple and rapid method of contouring have rewarded me bountifully through many years of watchfulness in this particular.

Fig. 25.

I left the filling in the mesial surface at the option of the dentist. In this case, as the filling is contoured to a delicate touching knuckle, I prefer to finish it, for the purpose of retaining the contour. The occlusal surface is cut and shaped by finishing burs or stones. The surplus gold at the cervical wall is removed by gold-trimmers (Fig. 24), right and left, and the sides can be trimmed in like manner. It is often desirable to use a file, as in Fig. 25, in finishing the cervical wall; also sand-paper disks and strips about the sides. Caution should be used to avoid the destroying of the knuckle. This point of contact is made smooth by simply passing a very thin, flexible, flat steel point between them (Fig. 26). By this means the original contact is maintained.

Fig. 26.



I am often asked if I use matrices. I do not, and can only say that they do not seem practical in this method of working. Instead of packing the gold from the bottom of the cavity upward, I work from the inner surface outward in an oblique manner, molding the gold laterally against the walls and over the margins of enamel, thus feeling sure of its adaptability. I fear this could not be accomplished if matrices intervened.

Fig. 23 shows the occlusal surfaces after the operation is completed. The time required, including the adjusting of the rubber-dam, is one hour and a half. I have said that the principles involved in preparing and filling these approximal cavities in the upper right first and second bicuspids are the same for all the bicuspids and molars, and for the distal surfaces of the cuspids

FIG. 27.

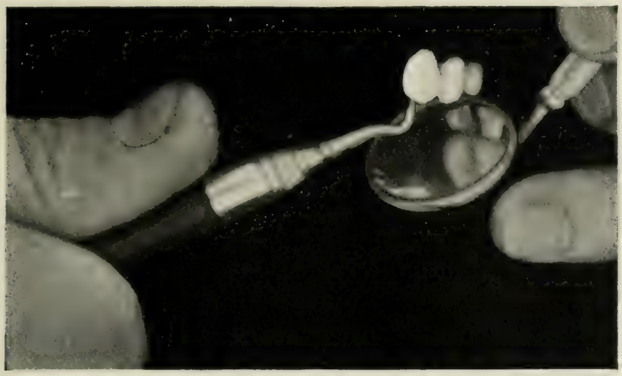


FIG. 28.

on the upper and lower jaws. The only variation I wish to suggest is in the position of the hand in filling on the left side. This is shown in Fig. 27. This photograph hardly expresses the ease which one acquires after a little time of working across the mouth. On that side the larger corkscrew points are used with the same freedom in packing the soft foil, and the smaller burnishing corkscrews are well adapted for the distal cavities. When the cohesive work begins on the mesial surfaces the largest foot burnisher, No. 9 (see No. 2, Fig. 19), serves best, and the entire cavity can be filled with this point, as it molds the gold into the grooves satisfactorily. To hasten the work, the obtuse point before mentioned, No. 11, packs and shapes the contour better.

This completes the operation on the approximal surfaces of all the bicuspids and molars. Before closing this paper, let me beg of those who have a little time to spare to place a cadaverous tooth or teeth in the neck of a wide-mouthed bottle, as shown in Fig. 28, which is a convenient size for grasping. Fill the bottle with plaster, and while it is in the plastic condition insert the tooth, which will be firmly held. All readers will have in their cabinets instruments that can be improvised for burnishing; for instance, the flat burnisher, old spoon-shaped excavators, the corkscrew form, with the spoon broken off; among the pluggers, the small corkscrew particularly, and the obtuse hand-pressure plugger for packing soft foil at the cervical wall. These will serve very well. I filled teeth for four years with no better instruments, and the results were wonderfully good. It is not wise to use ball-burnishers, as it is next to impossible to maintain an even surface. The motive of urging this experiment on a tooth is to establish in your minds a fact which has not been generally recognized,—that gold will cohere without the intervention of blows or roughened surfaces. From those to whom I have shown the working of this method comes the universal remark, "I would never have believed that gold would stick like that."

(To be continued.)

# FRACTURES OF THE MAXILLAE.*

BY FANEUIL D. WEISSE, M.D., NEW YORK, N. Y.

(Address before the New York Odontological Society, October 19, 1897.)

I HAVE not had time to write a paper, but I thought it would be a matter of interest to present some experiences with reference to fractures of the maxillæ, principally of the inferior maxilla.

There are several points anatomical that must be taken up first in approaching the consideration of fractures of the inferior maxilla, and the limitation, from the standpoint of anatomy, to those fractures which every large practitioner is called upon to treat. The usual descriptions of the inferior maxilla tend to confuse the practitioner as regards the different parts of the bone, more particularly in respect to the point of division of the body of the bone and the ramus. I am in the habit of describing the inferior maxilla as presenting the body and the two rami, designating the body of the bone as that portion which carries the teeth, and the ramus as the portion which is situated posteriorly to the teeth. This makes the appreciation of the fractures of the inferior maxilla much more clear. In the usual anatomical description of the inferior maxilla there is a very uncertain line of division between the body and the ramus. So to start with, the body of the inferior maxilla is that portion which carries the teeth, and the portion posteriorly on either side is the ramus. Of course that will carry the angle of the bone into the ramus, while the usual descriptions carry the angle into the body. Another anatomical point to be appreciated with reference to the inferior maxilla is as to the relative points of strength of the inferior maxilla. The weak spot of the inferior maxilla will naturally determine the situation where fractures are most likely to occur, and in the mechanics of the body of the inferior maxilla we find that it is weakened by the presence of the mental foramen, and therefore it is that we find the great majority of the fractures of the inferior maxilla to be present at a point immediately anterior to the mental foramen. That would bring the usual line of the fracture to a point which would rise between the anterior approximal surface of the second molar and that of the first bicuspid. That is the most frequent position of fractures of this bone. The next location of fracture is between this position, anterior to the mental foramen and the third molar. The third situation of fractures is between the mental foramen and the median line of the bone. The fourth point is usually in the ramus of the inferior maxilla. The fifth point is at the symphysis. The sixth point is in the body of the ramus itself, and the seventh is in the neck of the condyloid process, the eighth and last being the fracture of the coronoid process.

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*From the stenographer's report.

In not more than three cases out of fifty brought to us for treatment would there be found fractures in the body of the ramus, the neck of the condyloid process, or the coronoid process.

The next point in frequency where fractures occur is at the symphysis. Four cases out of fifty or sixty are met with with fractures at the symphysis.

The fracture that occurs from the symphysis to the alveolus of the third molar, to be a fracture, must be a dissolution of the continuity of the whole body of the bone. Some speak of a fracture of the bone where the alveolar process is broken away; but that cannot be regarded as a proper fracture. That is simply a splintering off of a portion of the bone.

In this bone there obtain different varieties of fracture. For example, the fracture of the bone, simple in character. Again, there may be a comminution of the bone along the line of the fracture. These cases of comminution complicate the progress of the case materially. But it is impossible to tell immediately after the injury as to the degree of comminution that may exist at the line of the fracture.

You will note that when a fracture occurs you really have to deal with a compound fracture,—that is, under the accepted definition of a compound fracture, which is one which has an external wound to which the air has access to the point of fracture. This obtains wherever the teeth are present in the alveoli. The fracture will pass upward into one of these alveoli, and the result will be that air will pass by the cleft in the soft tissues, and pus will make its way up between the teeth and the socket. The character of the buccal cavity seems to have a tendency to protection from sepsis; that is, as compared with a wound of the skin on the outside; and we find in these cases that the compound fracture is not likely to be complicated by the septic conditions which obtain in compound fractures of bone where you have a skin wound.

The complications that occur in these cases of fracture are not numerous in ordinary practice. I have seen a great many cases of these fractures, and in not one of them were the soft parts upon the surface of the jaw wounded. Nor have I seen a case where there was any internal or external wound apparent. We are never called upon to stitch a wound or to arrest undue hemorrhage. The only complications we usually meet are that the fracture has caused a loosening or dislodgment of one of the teeth, and, under these circumstances, the practitioner must decide as to whether he will remove the tooth or not.

To detect a fracture, the diagnostic feature is the false point of motion, but the disfigurement of the face very often is enough to determine that a fracture is present; also the fixedness with which the patient carries his lower jaw. The lower jaw is held by the masseters of the inferior maxilla in a very careful position, and is an indication of fracture. But the investigator of the case will find, upon having the patient open his mouth, that there is an obvious deformity. The crown surfaces of the teeth not being on their proper level, an inequality in the grasping portions of the jaw will determine the correctness of the diagnosis.

Now, the great desideratum in the treatment of the case is that it be treated as soon as possible. Delay is very unfortunate in these cases, as it prolongs the period necessary for satisfactory treatment.

The best results that we have obtained have been where the splint could be put in within twenty-four hours, or as near that period as possible. The longer the time that elapses without treatment, the worse the condition of the patient; but even with a fracture of two or three months' standing we have succeeded, after introducing the splint, in giving the patient the first comfort he has had up to the time of the introduction of the splint, and from that time on there is a decrease of pain.

Given a recognized case of fracture, the treatment is that of all fractures,—coaptation and permanent fixation. Coaptation, when the fracture is of recent occurrence, is easy to effect, provided none of the teeth are dislodged; comminution of the bone along the line of the fracture would make proper coaptation difficult. Under these circumstances comes the question as to whether the loosened teeth should be extracted, and I have frequently directed that a tooth which was very loose should be allowed to remain, hoping that when the splint was adapted it would tend to hold that tooth in place. In some cases I have succeeded in saving the tooth to the patient, and in others I have felt that it was wrong to have allowed the loosened tooth to remain, and have often wished that earlier in the case I had directed that the loose tooth be removed.

In treating a case where the tooth is taken out, it is well to probe and see if there are any portions of comminuted bone in the alveolus. Of course the dislodged tooth will be found in the line of fracture, and the comminution of bone is always found there. So that if you are called upon to extract that tooth, examine carefully in the socket of the tooth for any portions of bone that you can remove at that time. If you succeed in removing small pieces, you are saving your patient from a subsequent abscess; but I do not advise too rigid an examination of the alveolus in order to find loose pieces of bone, because the least possible irritation you give to this point of already irritated tissue the better. I have succeeded in taking out pieces of broken alveolus, which, if they had remained, would have resulted in an abscess.

After we have taken out the obstacles in loosened teeth, coaptation can be easily effected. Various methods have been attempted to obtain fixation of the coaptated point of fracture,—by bandage originally, then by the use of pasteboard softened by hot water, molded to the jaw, or by leather soaked in hot water,—but all these have been dropped.

I do not know of any more pitiable condition than a man with a fractured inferior maxilla without proper coaptation and fixation of the point of fracture. He cannot eat, drink, talk,—every motion of the jaw causes pain,—and he then realizes how useful a complete maxilla is. The comfort that obtains at once by the introduction of a splint that carries continued fixation is something pleasant to look upon in the condition of a patient thus afflicted.

There are various means, of course, that have been resorted to for the maintenance of the fixation after the coaptation. The external measures I have already alluded to. Now as to the internal measures that have been employed. We have various kinds of operations: First, surgical operation, exposing the point of fracture by incision and then wiring the fracture; and those who have attempted it report that they have had success in a certain number of cases, but a very limited number. I myself have yet to see the case where the attempt was made where it was a success. Among the numerous cases that have been coming to the college during the last twenty years, we have had a great many that have been in the hospitals of the city where the surgical operation has been performed, the point of fracture has been exposed, wires have been put in carefully, and every precaution taken for success; but in every case it was a failure. Of course a long time was lost to the patient, and his condition was worse after the wiring than before, for the reason that wire would always come out by the progress of necrosis in the socket in which the wire runs, and the patient has often lost portions of the inferior maxilla, which marred the ultimate result. We have at present a case where wiring has been attempted, and the condition of the patient is very much worse than it was before the wire was introduced. In the face of the results obtained with the interdental splint, the attempt to wire a fracture of the inferior maxilla should never be made. It is not a difficult operation, but it is one which is not attended with success.

The interdental splints that are used you are all familiar with. There are two kinds, the outside and the inside splint, and the inside splint alone. The outside and inside splint has a portion inside and a portion outside the mouth. The inside splint is purely and simply the interdental splint.

In the treatment of these cases, as soon as the patient has something applied to his inferior maxilla by which coaptation is maintained, he becomes useful to himself and others. He is ready to undertake anything that he did before, and can attend to his business; but he does not wish to be rendered unseemly to those about him. Therefore we should avoid as much as possible any such device, particularly if it does not add to the assurance of a good result. So the Kingsley splint, while it fulfills all the requirements of an interdental splint, has the disadvantage of having the wire sticking out of the mouth and the bandage under the chin. The Gibson splint also has the disadvantage of projecting in front of the chin. These are unseemly, and make the patient dislike to present himself in public. The bandage has to be resorted to for the interdental splint, but still that is nothing to the prominence given to the outside parts of the Kingsley and the Gibson splints. The results obtained by these splints are excellent, but they have the disadvantages which I have named.

Many of these cases of fracture of the inferior maxilla tend to the development of abscess at the point of fracture. We never can tell how much comminution has taken place at the line of fracture. If there is a very small piece of bone that has been comminuted, the fracture cannot heal without the extraction of that portion of comminuted bone. It will not adhere to the surrounding tissue. It has become devitalized, and you cannot prevent the occurrence of an abscess before the extraction of that necrosed bone. Therefore every patient should be told that the practitioner treating the case is not responsible for the development of an abscess, with a necessary opening externally for the portion of necrosed bone, as the practitioner cannot tell what degree of comminution has occurred. Everything must be done to prevent any undue outside pressure along the body of the bone. I have seen abscesses developed where cases have been treated by pressure, and have found that the necrosed bone was not the original cause of the external abscess.

The interdental splint, pure and simple, carried into the mouth is the acme of excellence as to its results in the treatment of these cases. Fractures of the inferior maxilla have passed out of the hands of the general surgeon and belong properly to the dental surgeon, by the results that have been obtained by treatment with the interdental splint.

I need not refer to what measures have been used, or the various devices,—the wires, caps, the adjustment, the wiring of the teeth,—in fact, all the ingenuity displayed by different practitioners in devising means by which the coaptated fracture may be kept in place, which present features of value and obtain good results; but I venture to say, and statistics show, that a much smaller number have been treated by these means than by using the solid interdental splint within the mouth.

Although these various methods will give a good result, the comfort of the patient is to be considered, and we know the patient is comfortable with the interdental splint. We have used it for over twenty-five years, and patients have always expressed themselves as comfortable.

Of all the splints in use, the one that recommends itself to me is the Bean splint, invented by Dr. Bean, of Baltimore. He certainly gave to the world an excellent splint, and one which has given a great deal of comfort in past years to many sufferers from fractured maxillæ. We all remember the time when President Lincoln was shot,—when Mr. Seward had his inferior maxilla fractured, and how Dr. Gunn, of New York, was sent for. He used the Bean splint. I have never been able to determine how he heard of the Bean splint, but from all the descriptions I have read I could not find any difference between the splint he used and the Bean splint. Of course the prominence of the patient let to the prominence of the treatment. I remember reading of the fracture, but I could not find from the description exactly what the nature of the fracture was,—whether it was simple, or whether it was fractured at more than one point. I remember seeing years afterward in some sketch of his life that he died with an ununited fracture of some portion of the inferior maxilla. That might occur under the best possible treatment. The patient may have a comfortable jaw,—a sufficiently formed union at the point of fracture to give a perfectly useful inferior maxilla.

I directed the Bean splint to be used at the college over twenty years ago, and we have used it ever since. The one that we made was the regular one, not the modified splint which I show you now. This modification of the Bean splint fulfills all that is possible with the splint itself, and patients are comfortable with it. The old Bean splint was a solid piece of rubber, which took in all the teeth of the upper arch. There was a slight cut in the middle, leaving the upper teeth lodged in the splint as well as the lower, and the slot was in the solid rubber. We used that for years and years, and had continued success with it. I notice recently that the slot is made by having the upper simply catching the lower teeth for the complete circuit of the denture, and then catching the molars, bicuspids, and cuspids, and allowing the upper edge of the slot to be formed by the cutting-edge of the incisors. Through this slot a patient can take all the nourishment he requires. Patients have told me repeatedly that they are perfectly comfortable with this splint. The result is just the same whether the complete form of the Bean splint is used, or whether the slot is made in the way I have just mentioned.

After the impression is taken and the splint made, there is great difficulty in getting it into the mouth. I believe now that that difficulty is obviated by capping the teeth of the lower and upper arches with tin foil after the model is made, so as to effect a space to enable the better insertion of the splint into the mouth.

In introducing the splint, and also in taking the impression, there is a period of pain for the patient. I think Dr. Kingsley makes the point that the best impressions are taken with plaster, and not with the modeling composition often employed for taking impressions, which you have to force down upon the teeth. With the plaster you can get a correct impression without pain, but the moment you try to get an impression by forcing the modeling compound over the teeth you are torturing the patient unnecessarily.

In introducing the splint it is better to be kind by being apparently rough in the beginning, so as to get the bone coaptated at once. Take firm hold of the fracture and bring the teeth well into position, and do it with your thumb and fingers. If it is a delayed case, where there may be a slight attempt at union, and if you crowd that splint into the mouth and try to work it into place, you are torturing your patient without effecting rapidly what you want to do. You must work that point until you can bring the teeth properly into position.

The point of fracture is now in condition to work the splint in. Be sure you have proper mobility at the line of fracture. Insure that by taking hold of the portions of the bone and by using the necessary motion by which coaptation can be immediately effected, and you can put the splint in easily.

The inflammation which sometimes follows the insertion of the splint along the line of the fracture does not mar the result at all.

In some instances where the introduction of the splint has been delayed for weeks it is necessary to refracture the bone, using a great deal of violence to do that; but in the majority of these cases there is only a fibrous union, therefore they are ordinarily easily refractured. In some instances we have to resort to anesthesia, using gas, then refracturing the point of fracture and introducing the splint while the patient is under the influence of the anesthetic. But this has rarely been necessary in my experience.

Now, as to the conditions with the splint in. The splint is intended to keep up continued fixation. When it is first introduced my own opinion is that it should fit tightly, so when you ask the patient to open his mouth the inferior maxilla will not drop, and the splint be carried on the lower arch and drawn away from the upper. The perfection of the interdental splint, in my judgment, depends upon its fitting tightly, and the best results have been obtained when this is the case. I have taken hold of such a splint and tried to pull it down, but I could not move it.

After the introduction of the splint, the bandage is applied to hold up the lower jaw. This the patient wears day and night, and if the splint holds the arches perfectly and tightly, you can dispense with it in a few days; but if the splint drops away from the upper arch whenever the patient drops the lower arch, the bandage must be worn all the time. If the splint drops over night, the bandage must be readjusted; but this will not mar the result, for the splint will remain on the lower arch and will carry out the desired purpose,—namely, fixation of the fracture. When the splint is taken out, where the mouth has been open during the wearing of it, the patient will complain that he cannot move the lower jaw, the play of the masseters and temporals is impaired, and he cannot chew for several days.

Complications will occur in the progress of a case which we must be prepared to meet, and the first is the occurrence of an abscess. Where an abscess tends to develop, do not attempt to abort it; work it to the point of culmination, make an incision, and very soon you will find that the necrosed portion of bone will come out; then the abscess will heal rapidly, and be merely a detail in the progress of the case. But if attempts be made to abort it by working down the tissues, you will find that your abscess will very much delay the healing process.

In reference to the experience which we have had at the college, as I look back in these long years, the number of cases that are presented is remarkable. During the summer we have had twenty cases under treatment, all running smoothly, and I have not seen a case where the interdental splint within the mouth was not successful in leading to the perfect repair of the fracture.

Given a fracture, you put the splint in, and you want to be satisfied that the bone is in proper place and the splint is going to do well. The first point is that you have proper coaptation. It is very necessary to determine some feature which would lead you to make up your mind that the splint is all right. The interproximal spaces of the upper and lower incisors should be on a line, no matter where your fracture is along the lower jaw. We have had complicated fractures of all kinds, sometimes where the body of the bone is simply made up of pieces, and yet we have brought the bones in coaptation. When you put the splint in the first time, you will find that instead of the upper teeth dropping there will be a slight declination, and no matter how you try to get that splint into position, you cannot bring the interproximal spaces one above the other. After trying a little, if you are not able to do it, do not continue to use force. Put the bandage on, and have the patient come the next day. You will be surprised to find that the splint has adjusted itself, and the spaces are one above the other. Sometimes you will find, when the case comes in the next day, that you have not succeeded; but always within two or three days the muscles will adjust themselves. I have seen this occur frequently.

These practical observations with reference to fracture of the inferior maxilla I have presented to you in a desultory way, but I hope that the observations I have made will present to you some points which may guide you to assurance and confidence in the use of the interdental splint.

I wish to call attention to a feature which we have been trying to attain in the making of the splint of late,—the gaining of time. To get a splint into the mouth as soon as possible is a great point, and our superintendent of the prosthetic department has been giving a great deal of attention to this subject. Dr. Nagle has devised a means of making the splint rapidly, so that we may say we make a splint while the patient waits. I have requested Dr. Nagle to talk to you with reference to the steps taken in making the splints.

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## RECIPROCATING TOOTH-MOVEMENT: A SEQUEL.

BY HENRY N. DODGE, M.D., D.D.S., MORRISTOWN, N. J.

(Read before the New York Odontological Society, October 19, 1897.)

THERE appeared in the DENTAL COSMOS for December, 1891, an account of a unique operation for the readjustment of the natural crown of an upper central incisor upon its own root, from which it had been accidentally broken by a fall on the ice, resulting in a fracture extending far up into the alveolus. To accomplish this it was necessary, as shown in the paper just referred to, that the broken root should be first drawn down partly out of its alveolus and then pushed up again into place after the crown had been attached to it.

I now present to the Odontological Society, at the request of its honored secretary, a sequel or appendix to the article previously published in the COSMOS.

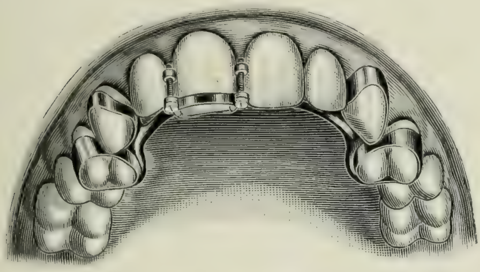
Nearly six years and a half have elapsed since that broken crown was replaced in the mouth of a little child ten years of age, and when I examined it in April last it was still doing good service. The relative position of the two central incisors, as shown in the photograph of a cast made from an impression taken on the 14th of last April and attached to this paper, is about the same as shown in Fig. 20, illustrating the close of the article published in 1891. The broken tooth was at that time left a little longer than the left incisor, which was not then fully grown, under the impression that when the left incisor had attained its full development the two teeth would be of even length.

The left incisor has indeed grown, but not as much as was expected, the length of the teeth of the patient's parents being the criterion.

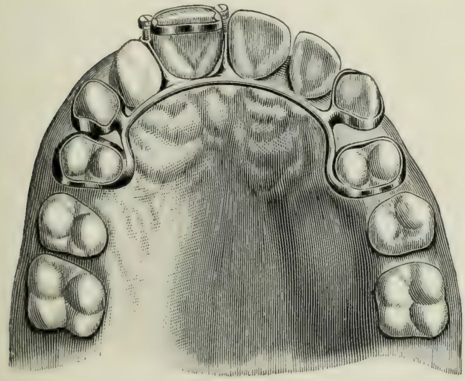
But so also has the mended tooth elongated to a corresponding extent, so that the relative position of the two incisors remains unchanged. Perhaps it would have been better had the two incisors been left of even length, at the risk of having the mended tooth left behind as the result of subsequent growth of the left incisor. In the absence of well-grown cuspids and bicuspids, four bands of thin gold plate made to fit the four upper incisors, soldered together and cemented to these teeth, were used as the most available retainer.

But it was extremely difficult to keep this or any retainer long in place, owing to the impact of the lower incisors, which repeatedly broke loose the retainer on the most inopportune occasions. Neither was it advisable to keep the jaws asunder by the continued use of a retainer which would break up the occlusion of the upper and lower teeth. The great difficulty with retainers has been the chief obstacle to a more complete success, complicated as it has also been by social considerations which forbade the use for an indefinite length of time of anything in the nature of a disfigurement. During the years since the first treatment the broken tooth has also manifested a remarkably obstinate tendency to rotate upon its axis, which movement has been twice corrected and has twice returned. I herewith present for examination two regulating appliances which have been used for the correction of the position of the mended incisor since the publication of my report of the case in 1891. No. 1, of which two views are shown, proved to be very powerful for the purpose of pushing up the incisor when the cuspids and bicuspids had grown enough to afford a fastening for the appliance. No. 2 was used for the rotation of the incisor back to its normal position, and its operation was faultless. The appliances will explain themselves on examination.

FIG. 1.

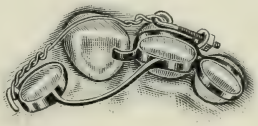


Labial view of regulating fixture.



Palatal view.

FIG. 2.



Upon a moment's reflection it will appear how slight an elongation of an upper central incisor will suffice to bring its lingual surface into contact with the antagonizing lower incisor in such a way as to produce an antero-posterior oscillating movement of the upper tooth with each occlusion, preventing the permanent stability of the tooth. Hence the retainer in such a case as the one under consideration must operate perfectly, or it is of no avail; and hence, too, it would be better to hold such a mended tooth a little too far up, in order to allow for a possible future elongation without subjecting it to the blow of its antagonist on the lower jaw. So much for the *position* of the tooth. As to its *color:* above the line of fracture the tooth developed a somewhat darker shade than normal at the time of treatment, due presumably to the long delay pending the filling of the root, and this darker shade remains. Below the line of fracture, however, and this comprises most of the crown, the color has remained absolutely perfect during all these years. As to the *mechanical strength* of the tooth: nothing more could be desired, and it is now apparently as strong as the unbroken incisor at its side, notwithstanding more than six years of constant use.

It is an interesting problem as to the best course of procedure should the natural crown ever become detached, or should it ever for any reason be desirable to replace it with a porcelain tooth, the difficulty consisting in the fact that the crown was broken off obliquely, the line of fracture extending nearly a quarter of an inch into the alveolus. On this point I invite suggestions. I do not consider the success of the new operation complete in this instance, but it does seem that as a pioneer case it points the way toward more perfect results in the future treatment of similar cases where circumstances are more favorable. No dental practitioner can fail to notice that the field for this operation is increasing in extent with the spread of the athletic craze, which annually yields its harvest of broken teeth. Indeed, during the early treatment of this case a fellow-dentist in California, after reading my report in the COSMOS, kindly sent me the crown of an upper right incisor fractured on precisely the same lines, and since then I have been surprised at the number of fractured incisors brought to my notice, resulting mostly from too great devotion to the game of foot-ball. From my experience, which I have thus I fear at too great length detailed, I am convinced that a substantial value attaches to the operation which I have called "Reciprocating Tooth-Movement."

# PROCEEDINGS OF SOCIETIES.

## NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, October 19, 1897, at the New York Academy of Medicine, No. 17 West Forty-third street, with the president in the chair.

Dr. JARVIE read a paper by Dr. Henry N. Dodge, of Morristown, N. J., entitled "Reciprocating Tooth-Movement: a Study with a Sequel,"—Dr. Dodge not being present.*

### *Discussion.*

Dr. J. B. LITTIG. It seems to me that this is one of a class of fractures that is quite interesting, and one that taxes our judgment somewhat as to its treatment. I have always felt a great deal of uncertainty as to what the result would be with regard to the change of color of the crown, and that is why I thought this case was of special interest.

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*Printed in full at page 196 of the current number.

Dr. JARVIE. The treatment of this case described by Dr. Dodge is a very unusual one, and it is interesting to learn of its condition after a lapse of six years. It is the only case I know of in which a tooth has been drawn from the socket a quarter of an inch, then operated upon, and afterward pressed back into its former position; and although all the conditions seemed unfavorable at the time of operation, Dr. Dodge tells us that six years afterward the tooth is firm in its socket and the union between the fractured parts remains perfect.

This case is one of a class which we meet with from time to time, and the earnest appeals of the sufferer to put the broken part back arouse our sympathies, yet we decide that porcelain must be used in place of the detached piece, a decision reached oftentimes owing to the difficulty of keeping the joints free from moisture during the operation. But Dr. Dodge has shown us how in one of the very worst of cases he drew down the root more than a quarter of an inch, until the line of the fracture was below the gum-line, thus enabling the rubber-dam to be applied and the fractured surfaces kept dry until the cement had become thoroughly hardened; pressure being afterward applied to force back the repaired tooth into its original position.

I know the report of this case will be of service to me, and I propose to put the information I have gained from it into practical use at the first opportunity.

Dr. LITTIG. I would like to tell of a case similar to this, which has been under my observation for a year, only the pulp has been devitalized for at least twenty years. In this instance the tooth was broken off at the cervical margin. I fastened the tooth somewhat similar to the way Dr. Dodge fastened his, by simply making a T-shaped pin, cementing the pin to the crown and then into the pulp-cavity of the root. At the cervical margin there was also a slight cavity, which had been filled with gold, and which I renewed, lapping it over the edge of the tooth slightly, so that the joint would not show. I have seen that case for a little over a year, and it seems to be doing good service.

The PRESIDENT. In these cases they rarely change color.

Dr. LITTIG. This was a devitalized tooth, consequently I think there will be no further change.

Dr. S. G. PERRY. I never yet saw a tooth broken so far under the gum that I was not able to re-attach the whole crown, so that I could not discuss the question of drawing the root down and then pushing it back. I have always succeeded, in the cases of broken teeth which I have treated, by packing cotton in the cavity and, pushing the gum away on all sides, set the pivot in what was left of the root, if there was enough to carry a crown at all. I remember one case of a tooth broken during a game of foot-ball, where the appearance of the break was like that in the picture, and nearly as far under the gum as shown. It was set in the ordinary way, and so far has been a success. Setting the crown as in Dr. Dodge's way would seem to be better than the ordinary way, but whether it would justify so long an operation, with the uncertainty that would naturally attend, would be an interesting question. It hardly seems practical, but the facts stated show that it has been successful.

Professor FANEUIL D. WEISSE, of New York City, gave an address on "Fractures of the Maxillæ," which is printed in full at page 188 of the current number.

### *Discussion.*

Dr. NAGLE. In the treatment of fractures of the maxillæ in the college infirmary we employ the interdental splint of the ordinary pattern, but instead of vulcanite, the material ordinarily used, we have recently been using tin,—casting the splint of ordinary bar tin. This method seems to have some advantages over vulcanite for this purpose, which give it a decided preference.

The preliminary steps in the construction of this splint, the making of the cast, the correction of the articulation of the same by dividing the cast of the fractured maxilla at the point of fracture, etc., are the same as when a splint of vulcanite is to be made, so that it is not necessary to describe those details. However, it might be well to mention the great importance of correctly placing the cast in the articulator. This cannot be done in a haphazard manner with any hope of a successful result, for, as in this form of splint, it is necessary to open the articulator so as to leave considerable space between the arches, and the line of motion of the cast of the inferior dental arch in opening the occlusion must practically coincide with that of the natural arch in the act of depressing the maxilla; so that the casts—upper and lower—shall be in their correct relative position to each other, with the occlusion open.

In order to accomplish this, the cast must be so placed in the articulator as to fulfill the following conditions:

*First.* The plane of the arches must be at the normal distance (approximately) below the axis line of the articulator (corresponding to a line passing through the condyle centers), about one and a half inches.

*Second.* A sagittal section through the casts should be at right angles to this line.

*Third.* The contact point of the lower central incisors should be at the proper distance from this axis line, so that lines drawn from this point to the condyles shall measure four inches (the triangle of Bonwill). For this work the Bonwill machine is better than the ordinary articulator, as it affords facility in setting the casts, and freedom of access to the inner surface of the wax pattern from which the splint is made. The occlusion having been opened sufficiently to provide a feeding space, the teeth are coated with thin sandarac varnish, and one thickness of heavy tin foil is burnished over each arch to provide the necessary clearance in the casting; for it is evident that if the wax form from which the splint is cast were molded directly on the cast, the splint would not fit, owing to the contraction of the tin and other unavoidable discrepancies. The covering of the teeth with the tin foil is accomplished in this manner: A sheet of tin foil about 1-200 of an inch thick is placed over one of the casts and pressed over the teeth with the fingers, so as to produce slight impressions of their edges and cusps; a blank is then cut from the sheet, having its margin about one-quarter of an inch beyond the aforesaid impression; it is then brought over the teeth, first with the fingers, then with a piece of soft wood, and finally with a burnisher. The margin of the foil is then fastened to the cast with wax cement. Both casts are prepared in this manner. A blank is then cut for each cast from a sheet of base wax of the same form as the foil, but narrower, so as to extend only slightly over the teeth. The tin surfaces are then lightly oiled, the base wax softened and pressed into place, and a roll of soft beeswax placed between the arches, and the articulator closed on it, uniting it with the base wax. The wax is then modeled with the fingers, carved, smoothed with a spatula, and finally polished with a cloth dipped in benzine. The feeding space is usually provided by removing the wax from the upper anterior teeth, which gives the splint such a form that it is not conspicuous when put in position.

The wax is now chilled with water, removed from the casts and invested in a flask, such as is used for cast metal plates, the investment being composed of plaster and beach sand, equal parts. The tin is then melted in a pan over a gas stove and the flame regulated so as to keep it at its melting point. The flask—the investment having set—is heated over a gas flame until the wax softens sufficiently to allow the halves to be separated; the wax is picked out and the pouring gates cut.

The investment must, of course, be dried out, and this is accomplished with great promptness by placing the halves of the flask in the molten tin and gradually sinking them until the bubbling or vibration caused by the escaping steam ceases. During this process the surface of the tin must be kept free from oxid, by removing it from time to time with an iron spoon or the ladle used in pouring it, otherwise the oxid would be likely to flow into remote parts of the mold, from which it could not be easily removed. When the metal is quite dry, as is shown by the molten metal remaining quiet, the tin is poured into it from a small ladle, the mold having been allowed to cool down for a few minutes to prevent the tin from remaining fluid long enough to cause considerable oxidation, which would, of course, produce a rough casting.

When the metal has solidified the flask is cooled with water, the casting removed and brushed free of investment; the gates are sawn off and the piece trimmed. It should come from the mold so smooth that it will not require polishing. The tin foil is now removed from the casts, and the fit of the splint tested by placing it between them. It is then ready for the patient.

Dr. John H. Meyer. May I ask how long it takes to make such a splint?

Dr. Nagle. We can take the impression for such a splint and have it in the mouth in about three hours.

Dr. MEYER. I am exceedingly pleased to be with you to hear Professor Weisse, but at the same time I must acknowledge that I do not agree with his method of treating fractures of the inferior maxilla. The cases the professor has mentioned here, and models produced, are simple every-day fractures, and do not in my opinion need such barbarous treatment, using, as I term it, a double-decker splint, tying the jaws together with a four-tail bandage and feeding the poor sufferer through a slot.

I have had quite a little experience with fractures since 1883, having treated nine cases at one time, but I fail to recall a single case where a double-decker splint was necessary. My method is the usual one employed by Drs. Gibson, Bishop, and others, taking an impression in the usual way, with this exception: I have discarded plaster, and use either modeling composition or wax, either of which will draw and leave no undercuts, which I consider of great importance. When a model is procured I burnish on to the parts the splint is to cover, three thicknesses of No. 20 tin foil. A splint so constructed will fit nicely and go over the teeth; the fractured portion of the jaw is then guided into the splint, and with the aid of a fracture-reducer replaced correctly. The splint is then tied to the remaining teeth with linen ligatures. In pursuing this method the patient will have full use of his jaws for masticating, thus avoiding the tortures of bandages and feeding through a slot. Not only once, but repeatedly, patients have reported to me that they were able to use the jaw for masticating on the second or third day. Not so with the double-decker. There may be cases where a double-decker splint is required of which I have no knowledge; a few years ago I had a case with four distinct fractures in the lower jaw, one between the first and second molars, one between the cuspid and first bicuspid, right side, another between the cuspid and first bicuspid, left side, and still another between the second and third molars on left side. I used a splint as I have described. I have letters to show from the surgeon who came to New York with the patient, defying any one to tell that the jaw was ever broken; what better results do you want? As to the splint Dr. Nagle exhibited, it is nothing more than a duplicate of a splint which Dr. Weisse advocates, and is made of tin instead of rubber, and can be made while you wait; yet he acknowledged that it takes him about three hours to complete such a splint, whereas a rubber splint such as I advocate can certainly be produced in less time.

Dr. RHEIN. It is somewhat confusing to some of us who, perhaps, have not had as much experience in seeing fractures of the maxillæ to listen to the rather varied remarks that we have heard. It has been my fortune to see a few cases of this kind, some of them under my own treatment, and I certainly cannot approve of the principles stated by Dr. Meyer in regard to the treatment of a fracture of the maxilla. It is at variance with every principle that has been brought to bear for the successful treatment of fractures; that is, the holding of the parts in perfect coaptation.

Of all these splints which have been brought to the attention of the profession, I agree with Professor Weisse that nothing that has ever been presented will hold fractures together with such absolute positiveness as such that are constructed according to the principles applied in the construction of the Bean splint. Just as soon as we adopt the method described by Dr. Meyer, we render ourselves liable to failure. That we meet with a certain form of success in some cases, and perfect success in others, does not give us any evidence that it does not produce failure in certain forms of cases. It is only within the past few weeks that I have had to operate on a case of fracture of the inferior maxilla, where the patient was under the observation of a surgeon for nine weeks. The fracture was due to a horseback accident, and while the other injuries were attended to the fracture of the inferior maxilla, at a point between the first and second molars, was left untouched, except that ordinary adhesive strips were used. This case came to my attention in August,—nine weeks after the accident. The patient was attended by a prominent surgeon here, who advised that he go to his dentist at once; this surgeon, in a note to me afterward, admitted that although he had examined the patient carefully, he had not detected that the maxilla had been fractured until I returned the patient to him for re-examination. Union had then proceeded to such an extent that the patient had thorough use of the inferior maxilla, although there was an evident deformity due to maladaptation of the fractured ends. An abscess had developed later, due to a comminuted piece of bone left at the point of fracture, and a refracture of the jaw was necessary in order to bring the maxilla into proper shape. I bring up this case to illustrate how much nature will often do to bring about a union, where so little is done by the surgeon or the person in attendance. It seems to me in treating these cases that to bring about a perfect result we must fix the fractured portions as perfectly as we can, to avoid improper fixation. In that respect I agree with Dr. Weisse, but there are two points upon which I wish to say a word. One is in reference to the production of abscess from external pressure. I have seen a number of abscesses in fractured jaws, where there was no comminution; in fact, in one of these cases, the cause was directly traced to the pulps of some of the adjacent teeth, and I wish to call Professor Weisse's attention to this point as being very likely to cause abscesses where there is no broken fragment of bone, and should not be attributed to external pressure, which I think insufficient to produce a real abscess. As to the point he makes about occlusion,—about putting the masseter and temporal muscles on the stretch,—I cannot approve of that principle. I think it invites a great many failures. I think the correct principle in putting in a splint is to bring the maxillæ into as close juxtaposition as possible, and to make the material of the splint that supports the two surfaces as thin as possible. I have had a great deal of pleasure in the magnificent result that I obtained in following out the form of splint (which is also a modification of the Bean splint) invented and described by Dr. Ottolengui in the January *Items of Interest*. It is very much on the plan of that described by Dr. Nagle. It is a metal splint. You can use any form of metal, and get your surfaces so thin between the points of occlusion that you practically bring the two jaws into as close juxtaposition as though there was no splint in position. In other respects the splint does not differ at all from the Bean splint, and I would like to call Professor Weisse's attention to it.

Dr. Meyer. I would like to know how Dr. Rhein reduced the fracture which he just spoke of, between the first and second molars—what sort of splint did he use?

Dr. Rhein. A splint similar to the one described by Dr. Ottolengui. That splint was so recently described in print that I suppose most of the members have seen it, and I do not think it proper to take up the time to describe it now.

Dr. Meyer. I cannot for the world see what Dr. Rhein is driving at. When the fracture is properly reduced it certainly must stay there, no matter whether the upper is in a splint or not. I am surprised to find that Professor Weisse is still advocating the double-decker splint, as a universal one. I claim there is no such thing as a universal splint; each case is a new problem, and should be treated accordingly.

Dr. Rhein. There are various kinds of fractures, and I have not the slightest doubt that a certain class of fracture can be successfully treated in this way. I do not want to be understood as saying that the parts cannot be united in that way, or that you cannot get perfect union; but the point that we are after, in curing a fracture, is that when the fracture is united it shall be as closely united as the jaw was originally, and in order to insure that we must have the relationship between the superior and the inferior maxillæ kept in proper alignment at every stage of the union.

Dr. Meyer. Why do you want to hold a superior maxilla in position if the fracture in the lower jaw has been properly reduced?

Dr. Rhein. The only point is that as soon as you fail to hold the two maxillæ absolutely together there is danger of getting a certain form of union, but not a union with the fragments in absolute adaptation.

Dr. Jarvie. I have listened with much interest to the lecture of Professor Weisse, but I cannot help thinking that there have been improvements in interdental splints during the past thirty-four years, and the splints shown to-night are exact counterparts of one I saw Dr. E. J. Dunning apply in 1865. I agree with Dr. Meyer when he says that splints can be made and are made that will hold the fractured portions of the lower jaw firmly in position, and at the same time permit freedom of movement at the joint. I can see no advantage in keeping the upper teeth fixed in the splint if the fractured portions can be held securely without it, while with such a splint as Dr. Meyer has described the patient has the complete use of the joint, both in eating and talking, and is relieved from that terrible distress and pain consequent upon the beginning of using a joint that has been fixed for some weeks.

Dr. Bishop. There has been a little matter of history brought up this evening by Professor Weisse in his paper on "Fractures of the Maxillæ," of which I wish to speak. I have enjoyed this paper very much; he has told us many truths of the sufferings and discomforts of fracture cases, and I can bear him out in every statement.

My first experience with a case of this nature was in 1861. In this instance the fracture of the inferior maxilla was caused by an explosion. The teeth and gums of the lower jaw were inclosed in a hard vulcanite rubber splint, fastened by means of screws. This was the first application of a hard rubber interdental splint for treatment of this bone.

The next case, a year afterward, was that of Dr. Gunning, who was thrown from his horse while riding down Fifth avenue. The bone was much displaced and two incisors loosened. Thirteen hours after the injury a vulcanite splint was applied which inclosed all the lower teeth, and was fastened to the molars by screws. This held the fragments so well that he was enabled to attend to his patients during the afternoon, and continued to do so without interruption.

The next case I saw was that of a gentleman who, in crossing Washington Square one night, was struck by a club and his jaw fractured between the cuspid and bicuspid. A more sensitive fracture I never saw. His breathing, swallowing, or the least movement of the muscles gave him much pain. A vulcanite splint properly adjusted to the injured parts gave him ease and allowed him to resume his usual occupation.

The next two cases were Bellevue Hospital cases of December 29, 1863, and February 12, 1864. These were most successfully treated by the vulcanite splint, which was the first time that the inferior maxilla had been treated in hospital practice by this method.

A most interesting case was that of a distinguished statesman in Washington, whose jaw was fractured on both sides between the bicuspids on April 4, 1865. Dr. Gunning was called to Washington to take charge of the case, which involved packing all our appliances, etc., from the laboratory, because that was in the early days of vulcanite rubber, and we had to be prepared for any emergency. The jaw contained all the ten forward teeth; the part in front containing eight teeth was drawn down out of place, while the right back fragment was drawn up, showing its fractured end white and bare. The splint had to be supported by means of wings of malleable iron outside, and was retained in the mouth for sixty-eight days.

Professor Weisse has mentioned the Bean splint; it is something I have never seen, and have only heard of it when it could be used in comparison with the Gunning splint. I am enabled to give most decided assurances of their perfect adaptability to the purposes for which they were devised, having experienced their many great advantages, which have been so fully described and illustrated in the *New York Medical Journal* for the year 1866.

In Dr. Gunning's case the jaw moved and had its freedom in every particular; the muscles there had perfect freedom, and there was no trouble whatever. John I. Hart, D.D.S.,
*Editor New York Odontological Society.*

## NORTHEASTERN DENTAL ASSOCIATION.

(Concluded from page 144.)

### FIRST DAY—*Evening Session.*

THE association met in the evening around the banquet table of the "Thorndike," and after doing liberal justice to the substantial entertainment provided, listened to an address by Dr. MARION N. WOODWARD, of Boston, on "Books and the Dentist."

The author pleaded the necessity first for introducing dental books and dental periodicals into the public library and reading rooms, where their presence would not alone give the dentist an opportunity to consult them, but would afford others such an opportunity, and besides would make evident to the people the fact that dentistry as a profession has a literature of its own that need not shrink from comparison with the literature of any profession. The dentist should keep posted in the successive editions of old books, and in the new ones which appear. In so progressive a science as dentistry only the new books and last editions are valuable, and the fact that a book was a text-book when the dentist graduated does not make him familiar with all that is in the last edition. She also insisted upon the advisability of all who could to do something in the way of original research and thought, and thus introduce themselves to the circle of active, useful, brainy men in the profession. Isolation is a malediction and fellowship is a benediction. Books introduce the reader into the best society of all ages.

There was no discussion of Dr. Woodward's paper, and Dr. CHARLES McMANUS read a paper on "One of the Present Needs of the Profession." This paper was published in the January DENTAL COSMOS, as was also the paper that followed by Dr. W. W. WELLS, Boston, on "Visual Defects of Dentists."

There was no discussion of these papers.

### SECOND DAY.

The morning session was devoted to clinics. The following operations were shown:

Dr. C. H. Gerrish, Exeter, N. H., soft gold and combination fillings. Dr. J. G. W. Werner, Boston, filling approximal surfaces in bicuspids and molars. Dr. George C. Ainsworth, Boston, contour filling in bicuspids and molars. Dr. Hy. A. Baker, Boston, contour fillings in bicuspids and molars with matrix; exhibiting models illustrating process. Dr. T. B. Hayden, Boston, filling bicuspids or molars by Libby method. Dr. G. A. Young, Concord, N. H., filling large molar cavity, using eight to ten sheets of gold; time, fifteen minutes. Dr. Charles L. Johnson, Pittsfield, Mass., ideal solid gold and open-faced cuspid crown. Dr. G. A. Bowens, Nashua, N. H., method of gold tip, and protecting porcelain crowns and facings. Dr. J. E. Waitt, cervical gold filling. Dr. J. S. Scott, Jamaica Plain, Mass., extracting pulps by the aid of cataphoresis. Dr. George F. Eames, Boston, illustrating anesthesia by rapid breathing. Dr. P. W. Moriarty, Boston, showed models of deformities of the mouth and jaws, also fracture of the jaw.

*Afternoon Session.*

Dr. Chas. A. Taft, Boston, Mass., read a paper entitled "A Consideration of the Objections Offered by Physicians to Amalgam Fillings."

Dr. Taft's paper consisted principally in letters from homeopathic physicians and their patients showing that in their opinions amalgam fillings caused a series of local and systemic disturbances ranging from a state of inflammation in the mouth to serious stomach and rheumatic disorders, and further, that the amalgam fillings made the cure of disease by homeopathic remedies impossible.

Dr. S. W. Langmaid, Boston, read the following paper on the same subject:

When I was asked to write or say something upon the subject of the objections offered by physicians to amalgam fillings, I consented to do so because, although my own experience has been so very small with cases in which I thought I could ascribe disease to the presence of amalgam fillings, I felt that the subject was well worth consideration, and because I was afraid that I might have overlooked the evil effects of such fillings or have ascribed morbid changes of the mucous membrane in the mouth and throat to other causes. I was very glad then to look through the medical literature in search of the recorded experience of other specialists whose attention might have been called to the subject.

So far I find only one report of a case where amalgam fillings were supposed to be the cause of aphthous-looking patches, from epithelial thickening and erosion.* I do find a few reports of cases where strong solutions of mercurials applied many times to the mucous membrane of the mouth produced ulcerations, in fact, mercurial stomatitis, and the following extracts embrace all that appears in late medical literature:

Lemoyez† relates the case of a female subject to tonsillitis, to whom during one attack cyanide of mercury was given as a gargle. This was followed by severe mercurial stomatitis, without salivation or gland enlargement. The author reviews theories:

1. Old theory—that mercury caused stomatitis directly at the moment of ingestion. 2. Next theory—that impregnation of system by mercury caused salivation, and this stomatitis. But, as shown, salivation bears no relation to the intensity of stomatitis. He cites Bockhardt's experiments, who, by repeated application of dilute solutions of mercurial salts to the buccal mucous membrane, was able in healthy individuals to produce local ulceration, this being especially developed on the cheeks opposite the line of apposition of teeth, where normally the friction from mastication causes greater loss of epithelium than elsewhere. Also a slight wound of the mucous membrane continually painted with corrosive

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*Harvey, in *Amer. Journal Med. Sciences*, 1886, p. 115.

†Sur la pathogénie de la Stomatitie mercurielle. *Bull. Med.*, Par., 1892, vi, 999.

sublimate, 1-2000, developed into a deep ulcer, while another similar wound left to itself rapidly healed.

From this and similar work Lemoyez concludes with Bockhardt that mercury diminishes the resistance of mucous membranes and hinders their regeneration, thus permitting bacteria to affect and invade the tissues. Complete sterilization of the mouth is impossible even with strong mercurial antiseptics. In the same category with mercury, as regards pernicious effect on mucous membranes, are to be placed bismuth, lead, and antimony.

De Renzi considers that mercury does not produce stomatitis by toxic action, but by modifying nutrition of the mucous membrane of the mouth.*

Galippe considers stomatitis from lead bismuth and mercury pathologically the same as ulcero-membranous stomatitis or septic stomatitis. All arise from diminishing resistance of the buccal field.†

Harvey refers to the action of amalgam fillings in the mouth, when coming in contact with the mucous membrane, as causing a white aphthous-looking patch from epithelial thickening and erosion. This is not leucoplakia, but may become so in a person predisposed.‡

I find no essays upon the injurious effects of amalgam fillings in the publications of the various laryngological societies. It seems strange that such a possible cause should not attract the attention of a body of observers whose field of observations is in the region where the baneful influence of such fillings might be expected to make such positive marks as would quickly attract attention. Especially is this to be supposed when the effects of the ingestion of mercury in large doses frequently reveal the reason for the administration of the remedy and call for reparative treatment. Mercurial stomatitis in varying degrees is not uncommon, although salivation is rare.

I have purposely confined my remarks and reading almost entirely to medical literature as opposed to dental literature, because I wished to keep clear of theories and to confine my remarks as far as possible to a recital of my own experience. If, in addition, I could present to you the recorded experience of other medical practitioners, I would consider my task fulfilled.

In looking over my cases of throat and mouth diseases I find that in only three of them have I thought the presence of amalgam itself might be the cause of a stomatitis and pharyngitis. I must say that the condition of the teeth in many cases has caused me to think that the abnormal state of the mouth and throat might be due in part to irritation from the diseased teeth and gums, and I have frequently to advise that the patient should seek the services of a dentist. In such cases I have found either that amalgam had been largely used, or that no care had been taken of the teeth.

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* *Revista clinica e terapeutica.* Feb., 1888. Cited in *Bull. Med.*, 1892, vi, 999.

†*Journal de Comparative Med.*, 1890, pp. 188, 195, 203.

‡*American Journal Med. Sciences*, 1886, p. 115.

I advise that gold filling should be substituted for amalgam where it is possible, because it has not occurred to me to see the condition of the teeth to which I refer where gold fillings have been used. Now, in saying this, I know that my observations are so limited in number and my complete ignorance of the art of dentistry is so great that I may be quite mistaken in my views and advice to my patients. But when I see in a young person superficial cavities, as well as the most profound ones, alike treated by amalgam, and especially when I find the edges of the fillings retracted from the tooth-wall, or a portion of a filling only remaining, with signs of irritation of the gums and particles of food lodged around these depressed and retracted fillings, I cannot but think that a different dentistry is needed and that the septic condition of these teeth may cause a prolonged or recurring irritation, whatever treatment I may think might be useful in different conditions.

It has seemed to me that in many cases amalgam fillings were more often used than was necessary, and that sometimes the desirable amount of skill and labor had not been employed. I am especially unsatisfied with the unstinted use of amalgam in the case of a young lady, handsome it may be, with regular white teeth which, were their crowns not black with amalgam fillings, might be of cosmetic service provided she was an actress or a singer, as indeed she intends to be.

I have not as yet touched upon the effect of the amalgam itself as a cause of irritation of the mouth or neighboring parts.

Now, in order to make any observations upon the cause of a disease or diseased condition, it is necessary to be definite with regard to the nature of the affliction. Suppose amalgam *per se* was the cause of disease of the mouth and neighboring parts, what condition of the mucous membrane would result? A disease well known to general practitioners as well as to the specialist,—viz, a stomatitis or inflammation of the membrane, with or without ulceration. Such a condition, as I have said above, is not uncommon in patients who are trying some mercurial preparation for the cure of syphilis, but I cannot say that I have ever been able to ascribe such a stomatitis to the constitution of the amalgam filling. When teeth are in the condition described above I have seen aphthous spots where the tooth came in contact with the cheek, but I have not considered these ulcerations as due to anything but to the mechanical attrition of the mucous membrane by a ragged tooth.

I have spoken of these cases in which I thought it possible that the large use of amalgam might have caused irritation because of the nature of the amalgam. Two of the patients seemed to improve when the teeth had all been treated by other than amalgam fillings. The condition of the mouth and throat had best be described. An unnatural redness pervaded the mucous membrane of the tongue, but also unnatural smoothness. There was no ulcerations, and the mouth was dry rather than moist. It was evident that the smooth appearance of the tongue was due to a loss of the papillæ. The pharynx was what has been described as follicular.

In these cases there was a serious impairment of the general health, with tormenting dyspepsia. As I have said, two of them were really improved after the fillings had been removed and others substituted. The third case disappeared and should not be considered.

This is a beggarly show of cases, but they are the only ones which I have been able to summon to prove the noxious effects of amalgam *per se,* and I shall find no fault with those who think they prove nothing. I have repeatedly seen similar appearances in mouths where there were no amalgam fillings, but associated always with dyspepsia. I must say that I have had my suspicion aroused frequently when this condition existed in mouths which were adorned with rubber plates. But that is another story. It is worthy of remark that the cases which I have referred to the dentist have all been women.

I have had the curiosity to look at some of the dental literature bearing upon the subject. Not in the least in an exhaustive way, for the dental aspects are only to be understood by the practical dental surgeon, and I am aware that I am addressing an American dental society. I did, however, think that I might appropriate as germane to my part of the subject such a remark as this: "The odium attached to amalgam is largely due to its abuse and misuse by those of the profession who should know better."* This was not written with the view of showing its deleterious effects anywhere except upon the teeth.

So far as my observation goes, then, I have negative evidence to show for the effects of amalgam *per se* upon the mucous membrane of the mouth and throat. It is my contention that bad dentistry may be the cause of irritation which may invade neighboring regions. In making such observations, preconceived theories, undescribed conditions, unphysiological and unscientific statements should be avoided. It may have been the celery, but it is more likely that it was the champagne that called for the aid of the shoehorn with which to put on the hat next morning.

I find this statement also in dental literature: "It (amalgam) has established for itself a deservedly unenviable reputation which, even in this enlightened day, has not been entirely eradicated, notwithstanding that it has proven its great intrinsic value and probably saved more teeth than any other one material."† Of the value of these statements I must allow you to be judges. Should you accept them as true, no chimerical theories as to its harmfulness should be allowed to deter you from the skillful use of such a preservative agent.

Dr. Edward Page, Charlestown, Mass., read a paper on the same subject, taking the ground that the case against amalgam had not been proven, the objections of the few physicians who were opposed to amalgam being unscientific, because they did not attempt to show how amalgam in some cases would act injuriously, while thousands of teeth filled with the same amalgam caused no trouble. He was convinced that where the removal of amalgam fillings was followed by recovery, the reason was probably in many cases due to hypnotic suggestion. When a person recovers from any disease he usually considers that the recovery is due to the medical treatment received, but physicians know that medicines really cure very few cases. Many diseases are self-limiting, and those suffering from them would recover without any special medical treatment, and whether amalgam was or was not removed from the teeth. Therefore statements from the few physicians who oppose amalgam as an obstacle to the cure of disease should have very little weight with unprejudiced and thinking men.

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*Dr. W. E. Halsey, Dental Cosmos, 1895.

†Dr. Kells, *Ibid.*, 1894.

Pure mercury, such as is used for amalgam, is inert and cannot affect the human system. Immense doses may be taken without harm.

Amalgam has been used for nearly seventy years in all countries of the world, and in billions of cases without harm. The evil effects found in the clientèle of a few physicians who oppose its use are due to their influence over their patients, who, being told they will suffer until the fillings are removed, continue to suffer, and if they were convinced that the fillings were harmless, would be well. Having been reasoned into sickness, they can be reasoned out of it.

Dr. TAYLOR, Boston, said amalgam saves more teeth than any other filling-material, but that it was because it was more used than any other. He thought that where they were indicated, gutta-percha and cement fillings were to be preferred. In the last two years he had placed very few amalgam fillings without putting cement under them. He does not wait for the cement to harden, but puts the amalgam in the cavity about ten minutes after the cement. He thinks this is much better than to bring the amalgam in closer contact with the tooth. He had one case of a patient brought to him by a physician who was opposed to amalgam fillings. The patient was suffering with an inflamed state of the mouth. Upon examination the amalgam was found to have been left with a ragged edge extending beneath the gum. When this was removed the trouble ceased.

Dr. A. J. FLANAGAN, Boston, said that the opposition to the use of amalgam had not yet presented any proof that amalgam was harmful. If they believed that mercury from fillings affected the system, they should prove it by demonstrating the presence of mercury in the system.

Dr. I. J. WETHERBEE said he had been in practice over fifty years and had used amalgam somewhat extensively, though gold had always had his preference. He had long since turned a deaf ear to the howlings of certain men whose objections to amalgam were without scientific foundation. How is it possible to extract mercury from a filling that is hard? and, if the mercury was extracted, would not the filling disintegrate? Then again the mercury would not affect the system unless it was in the form of a chlorid, and there is no possibility of its being changed to that form in the mouth or in any part of the human system.

It would be folly for a dentist to allow himself to be driven from the use of amalgam because of assertions that are not logically true.

Rubber plates, too, have been accused of having brought on mercurial poisoning. This is another impossibility. He had seen mouths which had been made sore and inflamed by the use of rubber plates, but it was because the plates heated the mouth and not because of the mercury in them. Gold plates sometimes have the same effect, though not so frequently, gold being a good conductor of heat.

Dr. GEORGE F. EAMES, Boston, agreed that the claims made by the opponents of amalgam were not substantiated by scientific proof. As he understood it, those who claimed bad results from amalgam fillings did not say that it was free mercury that did the mischief, but that it was a dynamic force. This school of physicians teach that the shaking up of medicines will increase their potentiality, but they have not yet scientifically proven this assertion, and, till they do, we cannot be convinced of it. He had asked a prominent homeopathic physician to attend this meeting and take part in the discussion, but he declined, saying that while they thought they knew that such increase in the potencies of drugs took place, they were not prepared to prove that it did.

Dr. T. PALMER, Fitchburg, Mass., had practiced dentistry for fifty-four years and had used amalgam for all this time, and had never seen a case where the amalgam had certainly injuriously affected the health of any one. Neither had he any experience from bad effect from red rubber. All complaint he had ever heard of amalgam came from homeopathic physicians. Amalgam fillings had preserved more teeth than all other materials. The only objections he had known from amalgam were caused by the fact that they were not as carefully inserted as gold would be, nor were dentists always as thorough in the preparation of the cavities for them as they should be.

Dr. G. A. MAXFIELD, Holyoke, Mass., said that this subject was frequently brought before dental society meetings in Boston, but rarely heard of anywhere else. We do not discuss it in as scientific a manner as it deserves. We use amalgams because we believe they save teeth. It has been said that amalgam can be put into a tooth so carefully that it will not shrink, but Dr. Black at a meeting in New York had a number of amalgam plugs which had been packed in glass tubes as carefully as possible, and of all shown there was not one which did not show shrinkage.

In his paper Dr. Taft did not say anything about whether the amalgam fillings had been put in carefully, nor did he say anything about the condition of the pulps, which in some of the cases may have been responsible for the trouble.

Dr. M. C. SMITH, Lynn, Mass., spoke of one of his patients who suffered with chronic stomatitis which resisted all remedies. After careful examination he found that a first molar had been filled with amalgam shortly after the second molar had been extracted, and that a piece of amalgam had fallen into the cavity from which the extracted molar came, and, remaining there, had been the cause of the trouble. He removed this, and the stomatitis disappeared. Some time ago he had considerable work to do for those who were manufacturing incandescent burners and working with mercury constantly. These often suffered with salivation, but not with stomatitis. When stomatitis is present he always looks for mechanical irritation, and usually finds it.

Dr. J. G. W. Werner, Boston, said that some time ago he had a case to fill, a right lower third molar; was filling it with gold. When two-thirds of the cavity was filled he found that the gold would not stick. He thought his assistant had gotten mercury or iodin perhaps on the foil-carrier, but found that it was not so. He removed the filling and filled again, with the same result. Upon making careful examination he found a portion of an old copper amalgam filling remaining in the tooth, and the mercury from this had destroyed the quality of his gold. This shows that it is a mistake to suppose that no mercury can come from an amalgam filling after it is hard. Those who make such statements should be more careful.

Dr. Taft, in closing the discussion, said that a great deal had been said about the homeopathic physicians basing their arguments upon mere assertions, but when a patient suffers for a course of months or years with a disease which disappears when the amalgam fillings are replaced with gold, it would seem like proof that the former caused the disease. There are many things which cannot be proven and yet cannot be doubted. When one of these little transparent midgets which you see flying about in the air alights on you and in a few minutes a lump as big as a hen's egg arises, we cannot prove by chemical examination that the little insect poisoned the flesh, but we know that it did from the effect. So with the prevalent disease called hay fever. The very conditions that render one person's life a burden will not have any effect at all upon others. Dr. Taft's sister, who is a homeopathic physician, had had a patient who could not eat strawberries without being covered with a rash, but who was entirely cured by the administration of homeopathic remedies.

The subject was passed, and the association adjourned.

## SOUTHERN DENTAL ASSOCIATION.

(Concluded from page 151.)

### Third Day—*Evening Session* (Continued).

A paper was read by Professor C. S. Neiswanger, entitled "The Prominent Causes of Failure in the Use of Electricity in Dentistry," which is printed in full at page 9 of our January number.

After the reading of Professor Neiswanger's paper a short communication was read by Dr. Brabson, reciting his experiences with the Van Woert cataphoretic apparatus, which had varied between success and almost total failure. The essayist hoped that more intimate study of the subject would result in a method by which successful results could be invariably obtained.

The papers read were then declared open for discussion.

Dr. Kells. I wish to ask Professor Neiswanger one question. When you drop two pieces of different metals in a fluid, so that they are submerged, do I understand you that there is a current passing between them, with a corresponding waste of material?

Dr. Neiswanger. Yes. For instance, if you put in your mouth two pieces of metal, the moisture of the mouth conveys the current, as you perceive by the peculiar metallic taste.

Dr. Kells. Is there a corresponding waste of material in that case?

Dr. Neiswanger. Yes; in every case.

Dr. Kells. Then why is it that we have cases where different metals have been in a tooth for forty or fifty years, and yet there has been no apparent loss of material? Is the loss so very gradual that it is imperceptible to us?

Dr. Neiswanger. It is probably because the metals are not submerged. You can't put the powders of a Seidlitz powder in a glass and add water without having decomposition. That produces electricity, and means could be devised to convey it out of the glass and demonstrate it. Chemical energy develops the electric current through waste of material.

Dr. Kells. Suppose they are not in contact; would the difference in potential persist?

Dr. Neiswanger. Yes; until they were connected, when the equality would be restored. It is like a series of suspended balls. The energy of the first one falling might not reach the fifth, but if separated with sufficient force the last one would be reached, the energy or force passing through the intermediate balls.

Dr. Kells. We have many instances where two metals in a tooth, as amalgam and gold, are in contact and kept constantly moist, and yet there is no evidence of waste.

Dr. Neiswanger. If they are kept constantly bathed in moisture, there must, nevertheless, be a current. It may be that there is so much internal moisture that the current is used up, and none left to decompose the metals. If you put two coins in your mouth, as silver and copper, and connect them, you immediately detect the current, the saliva being the exciting medium.

Dr. John S. Marshall. Dr. S. B. Palmer, of New York, established the fact, years ago, that there is a current between the two metals in a tooth until the surface is oxidized. It is for that reason that the surface of an amalgam filling becomes black; it is oxidized.

Dr. J. S. Thompson. If medicaments are not carried into the dentin by the electric current, how is it that the patient is sometimes affected by cocain applied cataphorically?

Dr. Neiswanger. The effect is probably due to cocain coming in contact with the gums; it may be taken into the system in that way. But the current cannot carry in the solution itself. The solution is decomposed; the hydrochloric acid remains at the positive pole, and possibly enough cocain may be carried in, in seeking the negative pole, to affect the patient constitutionally. To utilize iodin for breaking up or developing abscess, or in pyorrhea, you would never be able to carry iodin in by the positive pole; but if you apply potassium iodid with the negative pole, the iodin would act as an acid and seek the positive pole, the potassium remaining at the negative. If you apply potassium iodid on the positive pole, the iodin would remain and potassium, the metallic base, be carried to the negative pole, some being left in the tissues. Oxychlorid of copper, a valuable agent, could be used in that way, using a copper needle for the positive pole. The copper would be decomposed, oxygen attacking the copper, which would go to the other pole, driven in by cataphoric action. Used in that way, it would almost equal bichlorid of mercury, while it is non-toxic. Solutions or compounds are always decomposed, the base remaining at the negative. A small current, however, will not decompose cocain hydrochlorate. With wet cotton and the alternating current you can produce local anesthesia, tetanizing the nerve through fatigue of the tissue, producing an acid condition which is the beginning of death of that part, which is what anesthesia is. There is no necessity for using any medicament; polarization will do it, and it is not so dangerous as you might suppose if you have control of the current.

Dr. John S. Marshall. I have had considerable experience in that line in the reduction of inflammations and congestion. One morning in 1884, I woke up with a jumping toothache in the left upper second bicuspid, the first real toothache of my life. It was a Sunday morning. I ran down-town, trying to find somebody in his office on Sunday. It had occurred to me, in my studies in electro-therapeutics, that it might be possible, through the positive pole, to deplete congested parts, and that the negative pole would cause congestion. I accordingly went to the office of Dr. ——— and asked him if he thought it would be possible to relieve pain by means of electricity; at all events, I wanted to try it. At the end of twenty minutes the pain had entirely ceased. I then hunted up a dentist, who removed a gutta-percha filling. After a second treatment with the electric current the tooth was refilled with gutta-percha, and I had no further trouble with that tooth. In 1887, Dr. Ludwig filled it with gold. The tooth is still sensitive to thermal changes. That experience enlightened me as to the value of the galvanic current for the relief of pain, and I now use it constantly. I have an appliance made by the McIntosh Company, of Chicago, who had an electrical exhibit at the World's Fair, in 1893. Five times the value would not buy it if I could not get another. I am confident that it will not only relieve pain, but will save the pulp, unless it has been exposed to septic infection. The continuous galvanic current will reduce congestion, relieve pain, and save the pulp. In my first experience the operator simply put his finger on my tooth, he holding one pole, while I held the other. The McIntosh Company now make a variety of electrodes. No medicament is required in the use of the galvanic current; the current from the positive pole contracts the muscles of the blood-vessels, producing anemia of the part. I did not know anything about the changes from acid to alkaline conditions at that time. I thought relief was due to the muscular contraction in the blood-vessels. Then we knew nothing about voltage. I now use about six volts, with from four to five amperes, placing a sponge moistened with salt and water in the cups of the electrodes.

Dr. PRICE. It is just such a talk as this that we want, telling us *why*. My time is so valuable that if I can apply the electrodes mechanically, and meanwhile employ my time otherwise, I feel that I have accomplished something valuable. For this purpose I roll up fine wire and pack it in the cavity with cotton. I can detect a current as fine as the one-hundredth of a milliampere. Every time the heart beats I see it by the movement of the electrode. With an exposed pulp I can see the pulsations. I use annealed wire as fine as thread, and packed in the cavity. In Columbia, last summer, Professor Neiswanger took the position he has taken here, and proved it by demonstrations. Electricity is governed by certain laws that are well known, but there are various theories as to the action of the electric current in cataphoresis. The first is that it is due to polarization of tissue, and depends entirely upon the current, regardless of medicaments,—an inhibitory rather than a sedative effect. Another theory is that of osmosis; but when all the various theories have been analyzed we are forced to the conclusion that it is electrolysis, pure and simple, with perhaps some osmosis.

On motion, subject passed.

On motion of Dr. KELLS, a vote of thanks was tendered Professor Neiswanger for his paper.

On motion, adjourned to 10 A.M. Friday.

### FOURTH DAY—*Morning Session.*

The usual routine business was transacted.

Dr. W. W. H. THACKSTON, of the Committee on Literature and Voluntary Essays, read the following paper:

### THE MISAPPLICATION OF GOLD CROWN- AND BRIDGE-WORK.

The prosthetic department of dentistry, within the past decade, has made notable and most startling progress and advancement. The materials and the methods for the replacement of lost teeth, for the correction of abnormalities and irregularities in the dental arch, and for the successful treatment of lesions of the hard and soft palates have been most creditable to our present professional era.

With the advent of rubber, rose pearl, celluloid, and the base metals as the foundation for our so-called mechanical work, prosthetic dentistry went into partial eclipse and abandonment with, or by a large percentage of, our leading men and most skilled and reputable operators and practitioners. Society became crazed and demoralized by the proclamation of "cheap dentistry," and swarms of "rubber dentists" sprang up, thick as mushrooms in a hot-bed, and so rapid was the descent and so profound the depths fathomed by these dental fakirs that among the better class of skilled and honorable men in our profession it became a question of grave discussion and debate as to the expediency of sloughing off our prosthetic department altogether and remitting it to the men who almost entirely monopolized the patronage of the people, who were infatuated with the idea of "shoddy dentistry."

Some ten or more years since, an earnest appeal was made to the prominent and leading members of our profession to come to the rescue of our prosthetic department from the charlatans and impostors that infested every city, town, nook, and corner of our country, to the damage of society and the prostitution and dishonor of a necessary and benevolent calling.

That appeal was heeded and nobly responded to by many of our representative men. The precious metals, gold and platinum, once more appeared in our laboratories. We went back to Moses and the prophets; to the materials and the workmanship that had blessed humanity and added lustre to the names and memories of the "fathers." We also went forward with advanced, extended, and improved applications of methods and materials that had previously given character and illustration to the grandest achievements in the history of dental prosthesis.

Gold and platinum plates of exquisite workmanship and finish, the unequaled continuous-gum work for partial and entire dentures, were once more produced. Gold and platinum appliances for the correction of irregularities and for the relief of cleft palates and other lesions of the hard and soft tissues of the mouth were once more worked out, to the joy of patients and to the credit and honor of practitioners.

Along with the advances we have noted came the comparatively new operation of crowning with gold worn, decayed, and broken-down stumps and crowns of natural teeth, and the substitution of bridges for the wide and more cumbrous plates formerly employed.

The specialty known as crown- and bridge-work, when applied with skill and judgment, is by far the most brilliant and beneficial advance that has been made in modern dental prosthesis. With correctly made and judiciously applied crowns and bridges, and with an imperishable plastic tooth filling—stable, non-shrinkable, inexpansive, and of shades and colors matching the natural organ—the very perfection and ideal of prosthetic and operative dentistry would be realized.

But, alas! we have not yet discovered the unchangeable plastic, and the misapplication of crowns and bridges—their faulty construction and equally faulty adjustment—disappoints and disgusts our patients and creates distrust of our resources to meet their wants and fulfill our promises of utility and comfort. Not only is the foregoing statement true of much of the bridge-work which has come under our observation, but it is equally true that we now and then witness examples of gross and unpardonable violation of all hygienic and esthetic rules and requirements by the placing of gold crowns upon the diseased stumps of cuspids and incisors.

Unequaled and invaluable as is the prince of metals in both operative and prosthetic dentistry, it should never be made conspicuous in a human mouth, except under unavoidable circumstances and conditions.

It is always a sad misfortune, when we are called upon to save a valuable tooth, that we are compelled to place gold fillings where they expose and betray their presence with every word and smile.

Gold crowns should only be applied to roots and stumps of teeth out of view,—almost exclusively to the molars,—and neither crowns nor bridges should ever be applied or attached to other than perfectly sound and healthy stumps or roots. A bridge or crown fastened to teeth or roots which are in a diseased condition will always result in dissatisfaction and failure, and entail discredit and reproach upon the operator, as well as upon two of the most important and valuable advances known to prosthetic dentistry.

In brief, the safe and sure maxims for our prosthetic brotherhood are:

*First.* A sound and healthy condition of the hard and soft tissues of the mouth, including the gums, membranes, teeth, and roots of teeth.

*Second.* Porcelain crowns and facings for all anterior and exposed teeth.

*Third.* Perfect adaptation and artistic finish for each and every piece designed for insertion in the mouths of men and women.

On motion of Dr. B. H. Catching, a vote of thanks was tendered "the grand old man" for this contribution.

Dr. T. P. HINMAN, acting chairman of the Clinic Committee, reported the following clinical demonstrations:

Dr. R. OTTOLENGUI, New York, filled a central incisor, demonstrating the use of Williams's platina-gold foil in restoring incisive edges of badly abraded teeth. He used the platina-gold in narrow strips, packing with Bonwill engine-mallet. To avoid burning the outer layer of gold, thus exposing the platinum, this material must be carefully annealed, and at this clinic the doctor made use of the Custer gold annealer, which admirably served the purpose. In conjunction with the platina-gold, the clinician used occasional strips of Williams's rolled gold, No. 30, thus assuring a cohesive surface throughout the filling.

Dr. C. L. ALEXANDER, Charlotte, N. C., exhibited models showing the mechanism of a new method of crowning a tooth. The porcelain tooth, as well as the root of the natural tooth, was provided with a cap and post. The parts, being placed in position in the mouth, are held together with wax until removed, and soldered or united. By making the post in sections in this way he was able to set the porcelain crown at any angle upon the tooth to be crowned.

Dr. L. E. Custer, Dayton, Ohio, demonstrated his improved electric oven by fusing a full upper case. The oven has been enlarged so as to take in the largest cases in practice, and of different forms. The cause of the burn-out, which occurred in the first ovens made, has been found and corrected, so that now a burn-out cannot occur in the legitimate use of the oven. The wires are not imbedded in the fire-clay, so that the heat is immediately realized and none is wasted in conduction.

Dr. Robert Eugene Payne, New York, N. Y., gave a clinic on implantation. Man thirty; lost upper right central incisor eight years before. Sterilized gum and mouth with borolyptol; followed this with alcohol at point of operation. Cocainized gum on both sides of the process with two per cent. solution, using ten drops close to periosteum with pressure, and slowly; gave tablespoonful whisky. Waited three minutes; cut double flap,—outside flap long. With small Ottolengui bone-drill cut socket full depth; then enlarged it to accommodate small cone-shaped root. Great care used to preserve outer thin plate, that entire root be surrounded or covered with bone. Used small, slim, mature root, extracted from man fifty or sixty years of age; dense, hard, sound, with perfect pericemental membrane. Cut off the worn natural crown; fitted a Davis crown to match adjoining central incisor; shortened root in this manner without cutting off end of root. Filled root with paraffin and salol; cemented crown; sterilized root in one five-thousandth bichlorid over night. Washed out socket with borolyptol after cutting, and just before inserting tooth for last time placed a few crystals resorcin on root to make sure no infection could develop in the new socket, until nature should have time to protect the wound. Ligated with waxed 00 silk twist, by passing it around three teeth, using two cross-threads between the teeth and on either side of the implanted tooth; surgeon's knot, and a square knot above this. Instruments sterilized with aquæ ammonia, tooth with one three-thousandth bichlorid, hands with alcohol.

Dr. C. M. Carr, Salt Lake City, Utah, exhibited his method of "anchored adjustable dentures," showing full upper and partial lower practical cases. The full upper denture was "anchored" to cuspid root on the left and third molar on the right. This denture was attached in such a way as to make it impossible to place an excessive pressure on either of the anchorage piers. At the same time it was easily removed and adjusted by the patient. Lower partial denture, comprising first molar on left and second bicuspid, first and second molars on right, was "anchored" to second molar on left and second bicuspid on the right. It was "anchored" in position, as far as any liability of being thrown out of position is concerned, yet adjustable and removable by the patient at will.

Dr. W. E. Walker, Pass Christian, Miss., demonstrated the use of his "facial clinometer" in obtaining the condylo-occlusal angle of the subject for whom a denture is to be constructed; Walker's physiological articulator being set at the same angle, in order to secure a perfect balancing articulation. The demonstration was made on Dr. L. A. Smith, of Port Gibson, Miss.

Dr. Walker's promised comparative demonstration in the articulation of casts of natural teeth with the Bonwill and the Walker articulators could not be given, as no Bonwill articulator could be obtained.

Dr. W. J. BRADY, Kansas City, Mo., gave a clinic on fitting regulating appliances to models. In this clinic Angle's system of treatment was followed. The object of the clinic was to show what economy of time and labor there is in using ready-made appliances over the method of constructing appliances for each individual case. The clinic abundantly proved the point, Dr. Brady fitting twelve cases with appliances during the forenoon. To avoid the insinuation that might arise that the appliances shown might not do the work, Dr. Brady selected cases from his practice where he had corrected the irregularity by the very appliances shown, and in nearly all the cases exhibited models showing the correction accomplished. In every case the appliance shown was the acme of simplicity, combined with great efficiency, which are the main characteristics of the Angle system, and which undoubtedly place it *first* in the systems for the regulation of the teeth.

Dr. F. F. FLETCHER, St. Louis, Mo., demonstrated the advantages of a narrow saddle in bridge-work, proving it to be the only hygienic saddle. He also showed cases that have been in the mouth of the patient for six and seven years. Tissue under and around saddle perfectly normal. Also demonstrated that the piers in bridge-work should be parallel, and insisted that in most cases where they are not, regulating should be resorted to. When you have corrected the malposed pier and restored normal occlusion, thus making piers parallel, construct bridge and set. The bridge acts as a retaining appliance, holding former malposed tooth in original and proper position. Charts of cases were used to demonstrate.

Dr. V. H. JACKSON, New York, N. Y., demonstrated his method of making and adjusting a crib anchorage in regulating.

Dr. V. DE TREY demonstrated the filling of a left upper second molar masticating surface cavity; no undercuts or retaining points, the grooves left by the cross-cut burs being sufficient to retain filling. Used one-sixteenth of an ounce of Dr. E. de Trey's "Solila gold" and special instruments, with hand pressure; finishing margins with hand mallet and polished pluggers.

Dr. FRANK HOLLAND, Atlanta, Ga., filled two large compound cavities in the right upper first molar and second bicuspid, cavities extending well above the gum-line in each tooth. Bonwill electric mallet used.

Dr. STUMPH filled a large compound cavity in a right lower first molar with Morgan & Hastings' Crystal Mat gold.

Dr. D. J. McMillen, Kansas City, Mo., gave a clinic on the insertion of a gold filling in a large crown cavity of an upper right first molar, using White's "Globe Foil," absolutely non-cohesive or dead soft. No rubber-dam used; six sheets of gold; filling was inserted and stowed down in about twenty minutes. The gold was used in cylinder form, and as much as one sheet each in three cylinders; other cylinders were of different sizes. Wedging from the center all the time; only a little lateral condensing, from the fact that the walls were weak; depended on judicious wedging and riveting down end of cylinders after they were inserted. This method is fully described, with liberal illustration, in August and previous numbers of *Items of Interest.*

Dr. Gordon White, of the Committee on Appliances and Improvements, reported a paper by Dr. J. L. Wolf, Washington, D. C., on Libby's hand-pressure gold-pluggers, Royce mallet-points, and the Russell electro-magnetic mallet. Dr. Wolf, since reading Dr. Libby's article in the *International Dental Journal* for June, 1895, had had considerable experience with that peculiar design of hand-pressure gold-pluggers, supplementing them with the Royce mallet-points for the further conservation of physical strength, as well as for the condensing property of the latter. He reported most excellent results which he had had under observation for more than eighteen months, especially in cases of unusual difficulty, and he spoke highly of the efficiency and vitality of the instruments. He spoke with approval of the large and convenient size of the wood handles, which begets a feeling of confidence in the operator during the manipulative process of introducing a filling, which tends to avert much of the exhaustion incident to that line of operations. The Royce mallet-points are without doubt unequaled, certainly not excelled for safety and effectiveness where malleting is required, and when supplied with appropriate handles become very efficient hand-pluggers. But it is as mallet-points supplementing the Libby hand-pluggers that they are of incalculable value, for the twofold purpose of conserving physical strength and condensation of material. With the Russell magnetic mallet as the percussion force, they are capable of a very wide range of application, including most, if not all, the advantages of the foot-shaped point.

The Russell magnetic mallet, supplied with a dry-cell battery attached to the ordinary street circuit, is among the latest inventions of this kind, and combines a number of unique and essential features, among which are, convenient size for handling, lightness of weight, and adaptability for any kind of points.

The chairman reported the following new appliances: Mehlig's saliva controller, for which he claimed the following advantages: that it keeps the tongue and cheek away from the teeth, and forms a free space along them. In this space absorbents are placed, such as cotton rolls, wood pulp, spunk, or bibulous paper, which can be replaced as desired. A flat pad may be used over Stenson's duct, and be held in place by the outer edge of the instrument and upper teeth; once in place, it is self-retaining, so that the operator has both hands free. By its use many operations upon the lower teeth may be performed without the use of the rubber-dam. The patient can close the mouth to relieve the strain of the muscles, and the teeth still be kept dry until the operator is ready to proceed with his work. The instrument is durably made, and will last indefinitely.

Dr. Parramore, of Hampton, Va., presented a set of scalers especially designed for the treatment of pyorrhea. These instruments have crescentic blades adapted to fit closely to the root, which prevents slipping and accidental wounding of the tissues. They are intended to be made in pairs, one to work with a push and the other with draw cut. He also presented a modification of the Moffitt generator, of his own design, to be used as a sterilizer, which depends for its action upon formaldehyde gas generated by the combustion of wood alcohol.

Dr. W. E. Walker, of Pass Christian, Miss., presented his facial clinometer for obtaining condylo-occlusal angle.

Dr. W. H. Pohlman, Woodbrook P. O., Baltimore, Md., presented a simple means of applying a 24k. gold surface to German silver regulating appliances, dental instruments, and metals generally without the aid of a battery.

Dr. L. G. Noel, of Nashville, Tenn., introduced sterilized thorns of the prickly pear, which grow in various sizes, for the filling of root-canals, carrying with them chloro-percha. This little thorn possesses a springy flexibility most desirable.

Dr. R. E. Payne, New York, introduced a method for treating the antrum, consisting of a slender nozzle capable of being bent, a three-foot length of rubber tubing, and a funnel or cup. The cup is filled below the level of the face, then raised gently, flushing the antrum and avoiding the force usually accompanying the use of the syringe. Lowering the tube will syphon out the solution.

Dr. H. S. Lowry, Kansas City, presented his work, "Crown- and Bridge-Work System;" Dr. J. M. Straut, Portland, Me., his universal matrix-holder; Dr. B. Holly Smith, a gold annealer, consisting of a very simply constructed plate of mica for holding the gold over the annealing lamp.

The chairman called attention to the dental poultice made by Dr. Thos. Dotterer, composed of hops, slippery elm, gum tragacanth, cayenne pepper, etc., put up in thin muslin bags. He had found them very efficient in reducing inflammatory conditions about the teeth, and in hastening suppuration at the apex of the tooth.

The president further presented a set of very fine burnishers which he had found variously useful, also a pair of cross-action pliers modified from the two pliers, Nos. 13 and 17, of White's catalogue. They were used to hold medicated cotton while the gum or cavity is being dried for the application. The chairman believed such an instrument would go far toward breaking the habit of putting the ordinary foil-carriers between the teeth to hold the medicated cotton while preparation for its application was being made.

The report was accepted with a vote of thanks.

The report of the Committee on Cataphoresis consisted of a detailed report of the clinics, some thirteen in all, in which cataphoresis was used for operations upon the teeth. Report accepted.

Dr. W. W. H. THACKSTON, of the Committee on Necrology, reported appropriate resolutions upon the death of Drs. W. N. Morrison, John C. Storey, and Francis Peabody. The report was adopted, and copies of the resolutions directed to be sent to the families of the deceased.

A vote of thanks was tendered The S. S. White Dental Mfg. Co. for valuable assistance in the clinic rooms, and to Mr. Pike, proprietor of the Hygeia Hotel, and others, for courtesies extended to the association.

Upon motion of Dr. J. Y. CRAWFORD, the Southern Dental Association then formerly declared itself a branch of the National Dental Association, to be known as the Southern Dental Association.

The association then proceeded to the election of officers for the ensuing year, and after the usual ceremonies of installation, adjourned.

## ANNUAL CONVENTION OF THE SIXTH, SEVENTH, AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

(Continued from page 57.)

### FIRST DAY—*Evening Session* (Continued).

DR. C. S. BUTLER, Buffalo, read the following paper:

### DENTAL MATRICES.

"The difficulty of correctly filling the approximal surfaces of bicuspids and molars is so universally acknowledged that any means which renders this class of fillings more easy of performance and which promises more certain results than are usually secured will be regarded by every one as an important desideratum. It is also desirable to reduce the weariness inseparable from difficult operations of this kind, and with which all who endeavor to be faithful are familiar.

"My own experience in this class of cases has been excessive, and the constant repetition of extensive approximal fillings has so repeatedly exhausted my nervous force as at times to fill me with despair. It is therefore a satisfaction to have made improvements by which much of this difficulty is overcome; by which the introduction of gold has been rendered much simpler, more certain of success, and so manageable that I must now let others have the full benefit of my experience." Thus wrote Dr. Louis Jack in 1871, in introducing to the profession what he called his "Proximal Matrices;" and what he here relates as his experience must have been, I am sure, the experience of some before me to-night.

It is a law in the physical universe that demand and supply are equal. This has been especially true in the dental profession, and where, by the introduction of cohesive gold for fillings and the automatic electric pluggers with which to condense the gold, the necessity whereby approximal surfaces of bicuspids and molars might be restored to their original shape became very great. By the introduction of cohesive gold fillings the whole system of operative dentistry was changed. New principles governed in all our operations, and results never before dreamed of were attained.

The little devices of Dr. Jack's inappropriately, I think, called "dental matrices," played an important part in this revolution.

Probably nothing which has come into daily use in our practice has had stronger advocates or more persistent opponents than the dental matrices. From a humble and crude beginning we have to-day a series of beautiful and possibly in some cases highly useful instruments. Instead of the plain wedge-shaped steel of Jack we have the band and screw of Brophy, band and clamp of Guilford, besides other devices by other inventors, all and each having their advantages and advocates in a greater or less degree.

I am not, however, an advocate of the general use of these matrices. Indeed, there are few cases in my judgment in gold fillings where their use is indicated, and the positive objections to them in most cases are so great that I wonder at the persistency with which they are clung to by many good operators. The only matrices or band it seems to me wise or safe to use in approximal gold fillings is a narrow thin strip encircling the cervical border of the cavity, just sufficient to assist in laying the foundations for the filling, or in cases of decay extending and involving the neck of the tooth, to assist in crowding back and hold the gum out of the cavity. Even this much of a matrix is not necessary nor desirable except in rare cases. So far as I am aware, all matrices in the market are designed and intended to embrace the entire cavity exclusive of the grinding-surface, yet it has not been my experience that operations performed with these in position are more certain of success. On the contrary, I am convinced that our most successful work is done with an open and free access to every part of the cavity. Take, for example, an ordinary approximal bicuspid cavity. Prepare by first getting space, which can usually be done quickly and agreeably to the patient with a Perry or Parr separator, and then cutting well back into the grinding-surface of the tooth, which should always be done where the decay is extensive, not a V-shaped opening, but a square, broad opening, beveling well up into the grinding-surface, chiseling away the thin border of enamel at either corner of the cavity, and so on down the borders of the same till they are strong enough to withstand the process of filling without crumbling, and then adjust the matrix, and what do we have? Simply a dark, deep pocket, into which it is thought gold—cohesive gold—can be packed perfectly.

I think we should always bear in mind that the shape of such a cavity resembles somewhat a sectional view of an ordinary jug with a slightly enlarged mouth, a swelling out of the cavity at the knuckle of the tooth, so that the last or the second half of the opening is more difficult to fill; and it is just here that every part of the work should be brought under the eye of the operator, as it cannot be with the matrix in position.

Another objection when the Jack matrix is used is the constant tendency of the instrument to get away from the cavity, occasioned by the separation of the teeth, which in long operations amounts to quite an item. The objection to this is the necessity for building out more and more as we approach the end, so that when finished, instead of following the general contour of the tooth we have an overhanging edge to condense, which it seems to me must shake somewhat the foundation of our work. This objection is in a measure overcome in the use of the band matrix, yet when there is an approximal bulging of the tooth in the lingual or buccal surface, as is quite apt to be the case, the band cannot be made to embrace the cavity snugly without wedging, when we have the same conditions repeated as in the Jack device.

There are other objections to the general use of this instrument quite as great as those above indicated. For example, the uncertainty as to how the edges of the cavity are being filled, the inability of the operator to condense the gold laterally as well as lengthwise of the tooth, etc. But enough has been said to arrest your attention and cause you to consider whether the objection and difficulties I am urging are not true in your experience.

A noted physician once said that "in the use of antipyrin in fevers he had succeeded in getting a higher death-rate, but it had been done at an increased comfort to the patients." And so in regard to dental matrices. While by their use we have probably increased our failures, it has been done at an increased comfort to ourselves, for, after all, is not the element of personal comfort the controlling one in our use of these instruments?

### *Discussion.*

Dr. BUTLER said his objection to the use of the matrix was that in filling an approximal cavity the band matrix could not be made to fit closely to the teeth without wedging. When filling with amalgam he believes them to be useful; he knew that there were men who always put the matrix on, and who always do the filling perfectly, but he had never been able to obtain the same success that these did, especially in approximal surfaces. He found sooner or later a pitting in the center of the filling. Dr. Bonwill suggests that the band matrix stretches under the force necessary to pack the gold, and this causes the pitting; for this reason and the impossibility of getting lateral pressure on the filling he had abandoned the use of matrices.

Dr. C. S. BECK, Wilkes-Barre, Pa., uses the matrix whenever he can, and flatters himself he can see every part of the filling. He makes his own matrices specially for the cases they are needed, using worn-out files or thin copper like that used in electrical machines for collecting the electricity. He uses two wedges to hold the matrix firm, and mallets against the matrix as thoroughly as against the walls of the cavity. He would have no overhanging edges. In central incisors where the lingual surface was gone he would introduce a matrix in such a way as to give him a perfect lingual wall, and he would see every part of the filling as he put in the gold.

Dr. W. A. Barrows, Buffalo, thought the fault with all straight band matrices was that they would not embrace the tooth closely. The Lennox matrix, made in the shape of a segment of a circle, will. The longer edge flares out, and the shorter edge will embrace the tooth closely.

Dr. Frank B. Darby, Elmira, thought matrices had been as great a comfort to him as anything that had come into dentistry, but they had also been the cause of more failures than anything else. He could not put in a plastic filling in an approximal cavity without a matrix. He could not use wedges, as advocated by Dr. Beck, for he knocked them away every time. In some cases he filled a cavity half with the matrix on, and then found he could finish it more satisfactorily after removing the matrix.

Dr. M. B. Straight, Buffalo, had failed with matrices more frequently than he had succeeded, and found it as Dr. Darby said, better to finish the filling with the matrix removed. He found that he could not pack the gold perfectly against all the walls of the cavity while the matrix was in place.

Dr. Beck thought in many cases it was advisable to fill the first half with non-cohesive gold and then finish with Solila gold or Steurer's gold, or Crystal Mat gold made by The S. S. White Dental Mfg. Co.

Dr. F. E. Howard, Buffalo, said that Dr. Beck had voiced his sentiments to a large degree. He would not use cohesive gold from the start, but fill the first half with soft gold. The great advantage of the matrix is found when you use a gold so soft that it can be consolidated in any direction just where you want it. He prefers to use the Jack matrix where he can, because the convex surface of the matrix gives the contour of the tooth. When there are approximal fillings it is desirable for them to knuckle up together. The first gold inserted in the cavity should be a long piece of soft gold, so that when it is crushed down there will be no tendency of one side tipping up. Then by working always against the matrix you will be driving the gold tight against the wall of the cavity. When the cavity is half or two-thirds filled it is better to finish with cohesive gold. He could see no reason why one could not get light into a cavity when the matrix was on, but did not like band matrices except in extraordinary cases; when he needed one he made it, and contoured it with the contouring pliers.

Dr. Barrows said the matrix converted a compound into a simple cavity, and it should be treated as a simple cavity; the gold should be solidified against the matrix the same as against the walls of the cavity.

Dr. Butler said he was reminded of a society meeting about twenty years ago, where Dr. Kingsley presented a paper in which he said with much trepidation that he had been filling the bottoms of cavities with amalgam. He had done it secretly, and was almost afraid to acknowledge it. When the paper was discussed, he was astonished to learn that almost all who took part in the discussion had been doing the same thing. In using matrices he, too, was surprised to learn that nearly all had had experience similar to his own. There was one exception, however. He could not agree with Dr. Beck when he said that the first gold should be introduced in a large piece. He had found it a physical impossibility to properly pack gold, either soft or cohesive, commencing with large masses.

The subject was passed, and the convention adjourned till the next morning.

(To be continued.)

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# DENTAL SOCIETY ANNOUNCEMENTS.

## ODONTOGRAPHIC SOCIETY OF CHICAGO.

THE election of officers of the Odontographic Society of Chicago for the ensuing year resulted as follows: G. W. Swartz, president; H. J. Goslee, vice-president; F. H. Zinn, 70 State street, secretary; George N. West, treasurer; B. J. Cigrand, member of Board of Directors; E. K. Bennington, A. G. Johnson, F. E. Roach, Board of Censors.

## ILLINOIS BOARD OF DENTAL EXAMINERS.

THE next meeting of the State Board of Dental Examiners will take place at Chicago, in the room of the Board of Education, Schiller Building, March 12, 1898. All applicants should notify the secretary of their intention of taking the examination previous to the date of the examination.

J. H. SMYSER, *Secretary*,
70 State st., Chicago.

## BALTIMORE COLLEGE OF DENTAL SURGERY.

THE fifty-eighth annual commencement of the Baltimore College of Dental Surgery will be held at Ford's Opera House, Baltimore, Friday, April 1, 1898, at 3 P.M. The alumni meeting will convene in the College Building, Thursday, March 31, at 11 A.M., to which all graduates of this school are most cordially invited. Eminent essayists to be present. Banquet at night.

W. W. DUNBRACCO, *Secretary*.

## HARVARD ODONTOLOGICAL SOCIETY.

THE officers for the new year are as follows: Arthur H. Stoddard, D.M.D., Boston, president; Joseph T. Paul, D.M.D., Boston, recording secretary; E. B. Hitchcock, M.D., D.M.D., Newton, corresponding secretary; Lynn F. Bigelow, D.M.D., Boston, treasurer; Henry L. Upham, D.M.D., Boston, editor; Joseph T. Paul, D.M.D., Frank T. Taylor, D.M.D., William P. Cooke, D.M.D., executive committee.

E. B. HITCHCOCK, *Cor. Secretary*.

# EDITORIAL.

## LAW AND MORALITY.

THE editor of the *International Dental Journal*, in its February issue, discusses the relationships of these two factors of social evolutional progress, and particularly the specific relationship of dental legal enactments to dental morality. The editorial in question is an extension of a discussion upon the subject of dental legislation which has recently appeared in both the *International Dental Journal* and the DENTAL COSMOS.

While we do not care to discuss the broader question raised by the able editor of the *International* as to the causal relation between law and morality in general, we cannot but feel that there is much available evidence tending to show that, both directly and indirectly, the latter is a result of the former. It is not claimed by this that law of any sort, by itself, ever made a man good, virtuous, or honest. There are usually co-operative factors in the shape of natural tendencies which help to fix these elements in the characters of men. Laws are merely expressions of what will occur should the individual cease to be good, virtuous, or honest, as the case may be. They represent the sentiment of the social majority who are striving to be moral and upright toward that portion of the community who are not.

We freely admit that no human law is as yet conceivable which can alter the evolutional process to the extent that, while securing the survival of the fittest, it will prevent the destruction of the unfit, the one being a necessary corollary of the other; therefore "prisons, insane asylums, idiot asylums, and such constantly multiplying evidences" will continue to exist. But, may we ask, is that any reason why, "in respect to law, civilization is a stupendous failure"? We fail to see the necessary connection between the premise and conclusion in that statement. Are our sanitary and police regulations a stupendous failure? Are our laws regulating marriage and divorce useless? Would society be improved by an abrogation of all the legal restrictions imposed upon the ignorant and vicious for the better protection of the virtuously inclined members of the body politic? Surely that is not the argument intended to be advanced by the editor.

A misconception of the objective purpose of dental legal enactments seems to characterize the sentiment expressed in the following, which we quote from the editorial under consideration: "This almost insane demand for law and more law should be brought to the test of reasonable discussion, for if there is any one thing to-day that needs the light it is the demand, constantly made, for an increase of law to effect a higher moral standard in the dental profession. If it has not this meaning, then it can have no value. It is apparently the effort to bring all to a certain standard of ability, and thus drive to oblivion all empirical workers fattening on the gullibility of the general public. If this were possible, then law would be gratefully recognized as the most valuable adjunct of professional excellence." But the editor believes that legal enactments are powerless to control the "empirical exhibitor of show-cases," because "they are powerless to increase the moral force of the individual."

If efforts at dental legislation are to be regarded as insane demands, the indictment can only rest upon the assumption that they are demands for the impossible. But are they to be so classed? Does experience show that professional standards have been, in general, lowered or improved through the operation of state laws regulating dental practice?

The editor of the *International Dental Journal* refers to "a period when every dentist was a law unto himself," which doubtless relates to a time previous to the passage of a dental law by the state of Alabama in 1841. During that period it is asserted that "the men who practiced dentistry were as truly infused with professional spirit as now," and "that the lines of professional ethics were as closely drawn." Let us admit even this; but that was over half a century ago, since when the whole complexion of dental education and practice has changed. Competition among practitioners was practically unknown; and among colleges—well, there were no colleges, as we now understand that term. The growth of dentistry, the numerical increase of its practitioners, the development of its educational machinery have necessitated the enactment of certain wholesome legal limitations upon its occasional tendencies toward exuberant growth, just as increasing complexity in any social system brings about the same need. Hence to hold that because dentistry in its infancy needed no law for its government it would therefore be safe to do away with legal restraint under the conditions of its present development, is a proposition which "lacks the harmony of adequate support," because the bases of comparison are not parallel.

If it be admitted that "law is an outgrowth of an effort of society to protect itself," the application of that axiom to dentistry is obvious. The higher standards of dentistry are protected by laws which are the safeguards that legal restrictions impose upon the ignorant and incompetent; the environments of dental professional life are, as a consequence, created in part by the operation of dental laws, and in so far as their tendency is to create an environment of professional morality, to that degree is "morality a product of law."

As to the dental law of Pennsylvania, the editor has evidently overlooked one important clause which has direct bearing upon his contention with respect to that statute. He says, "It is idle to assert that the present law, so much extolled, gives the power to find out the competency of the examining board. *It does give the right to all interested to examine the questions*, but suppose the questions are not what they should be, what then? Is there any power existing anywhere to displace these officials?" The dental law of Pennsylvania on this point is sufficiently explicit, and in Section 5 provides that the Governor "shall remove any member of said board for continued neglect of the duties required by this act, or upon recommendation of said society (the Pennsylvania State Dental Society) for incompetency, unprofessional or dishonorable conduct." No power could displace these officials during their terms of efficient and honorable service, but they can be displaced at any time should the contrary be proven against them.

It is not equitable law which is the source of offense, but the ill-considered enactments which vest a small body of men with autocratic powers, and whose judgments are not subject to revision or their work open to inspection. Even though their honesty be above reproach, the operation of a law which does not provide for a public supervision of their work necessarily places them in a position where they are objects of suspicion. An equitable law is not only not an obstacle to development, but a most efficient aid to progress, and we still contend that "the salvation of our educational system depends upon the enactment of such legislative safeguards as will conserve our higher ideals and prevent the licensing of practitioners who are a disgrace to their calling."

The need for effective legal restriction of the incompetent is one which is, in some of its aspects, set forth in the following anonymous letter received at this office since our previous issue. We do not, as a rule, print anonymous communications, but this one is of such a unique character that we feel the request of the writer should be granted, especially for the convincing proof which his letter furnishes of the need for legislative safeguards for our professional standards:

New-York. 2. Febr. 1898.

To the Editor of the "Dent. Cosmos'

*Sir!* As an old reader of your estim. paper I would like to direct your attention to a fact not yet mentioned in your or any other paper.

Tough it took a good many year to bring the Dental Faculty to a higher position, there are a good many so called dentists, what regard the Dentistry as a mere business. They open 5-6 offices but with one diploma, what entitled the holder only for one registered place. Is the diploma made out for a single person or for a company (The call themselves that and that comp.) The advertise the "business" whit all possible humbug and do the work at so small prices, that no responsible dentist can ever undertake to do it. Of course they would not take the responsibility, if a patient comes with a complaint, the master will put it on the employée, and the other way, so that the public will have the damage.

Besides that, there are big Dry-Goods houses what open a Dentistry as a Departement. The might have a graduated Dentist to run it, but they will surely not be responsible, if there is any damage suit and will act just as the above said.

This thing will in a short time bring the Dentistry to so a low degree, that a qualicat. dentist will have to apply for work at the big stores and companies.

Thos better situated dentists, what treat the upper 400, will of course not suffer under the competition, but only those, who look for costumers among the common people. These would of course—if the Dental Society takes any step in this matter, join the latter and would be willing to bring pecuniar help, to stop the degradation of the dentistry.

I hope, you will give these lines your attention and by publishing them would oblige yours respectfully

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"Lacking Journalistic Courtesy.—We are glad to see that the Dental Cosmos has noticed the advent of the *Indiana Dental Journal*, which very recently appeared. We were under the impression that the editor of the Dental Cosmos was not aware that there is such a thing as journalistic courtesy."—*American Dental Weekly*.

This is really too bad! Inexcusable, in fact; but even if we have been derelict in calling attention to the advent of our bright little contemporary, it may perhaps interest its editor to know that the *Weekly* is one of the selected list of periodicals to be read through from cover to cover in this office, and we doubt not that it is so treated elsewhere.

# BIBLIOGRAPHICAL.

A SYSTEM OF DENTAL SURGERY. By the late Sir JOHN TOMES, F.R.S. Fourth Edition, Revised and Enlarged by CHARLES S. TOMES, M.A., F.R.S. With 289 illustrations. Philadelphia, P. Blakiston, Son & Co. Price, cloth, $4.00.

Tomes's Dental Surgery needs no introduction to dental students or readers of dental literature. It has so long been a recognized standard that a general discussion of its merits would be superfluous. The present edition is a notable improvement upon its predecessors, as a result of the careful and intelligent editing which it has received. Much redundant matter has been omitted, including that which from the developments of the science and art of dentistry and dental surgery had become obsolete, and its place is satisfactorily filled by that of more recent origin. As in previous editions of the work, a conservative attitude is maintained by the author with respect to his teachings. If one were inclined to criticise, it might be in the direction that in some cases the author is rather too conservative; but if this be a fault it is on the side of safety, and may well stand as an offset to much that is offered which it were better had it been left unsaid. The work is a satisfactory exposition of the topics with which it deals.

CATAPHORESIS, OR ELECTRIC MEDICAMENTAL DIFFUSION AS APPLIED IN MEDICINE, SURGERY, AND DENTISTRY. By WILLIAM JAMES MORTON, M.D., author of "The X-Ray, or Photography of the Invisible." One vol., 8vo. Illustrated. American Technical Book Company, New York. Price, half morocco leather, gilt top, $5.00.

So far as its uses in dentistry are concerned cataphoresis has passed beyond the stage of tentative experiment, and is now a legitimate dental therapeutic means. It is therefore fitting that the main facts of this expression of electric energy should be gathered together into convenient book form, and further, that such a task should be undertaken by one so well qualified for the work as the author of the present volume. Dr. Morton's work in the developmental stages of cataphoresis in dentistry is well known, and it may be safely said that while he was ably aided by others in his labors in this, to him, new field, it was his exhaustive study of cataphoric phenomena which gave the impetus which finally made their adaptations to dental therapeutics possible.

The exposition of the subject is peculiarly clear and well done. The author at once stamps his work as that of the teacher. The basal principles of molecular physics and chemistry which are essential to a proper understanding of the work are set forth in most attractive style and with great clearness. It may disappoint those who prefer an encyclopedic treatment of the subject, but for those who require a plain, practical exposition of the main facts and principles, this is the book *par excellence.* The five chapters which compose the work are arranged as follows:

Part I, Historical; Part II, Physics and Physiology; Part III, Apparatus and Outfit; Part IV, Applications in Dental Surgery; Part V, Applications in Medicine and General Surgery.

# OBITUARY.

## DR. HENRY S. CHASE.

DIED, at his home, "Kumfort Kottage," at Benton Station, St. Louis, Mo., at midnight of January 11, 1898, Professor HENRY S. CHASE, M.D., D.D.S.

Dr. Chase was born at Saxons Village, near Bellows Falls, Vermont, on March 6, 1820. His father was an eminent physician and surgeon for that time, and the son seemed destined to follow in his footsteps. He first attended the Boston Medical College, but finally graduated from the medical college at Woodstock, Vermont, in 1843.

While at Boston he became acquainted with Dr. Fredericks, then a successful dental practitioner, from whom he took a course of private instruction.

He afterward attended, but did not graduate from, the Baltimore Dental College. He was then engaged in the practice of dentistry at Woodstock.

He married Miss Sarah Haskell at that place on January 1, 1845. Their wedding trip was a sleigh ride to Montpelier, the sleighing being excellent. He resided at Woodstock until 1856, when he moved his family to Byron township, Iowa, six miles from Independence, building the first frame house in that township. He resided there till 1861, when he established himself at Independence, dividing his time in practice between that town and two towns in Fayette, the adjoining county, where he continued until 1865. At this time the Cincinnati Dental College conferred upon him the degree of D.D.S., and at this time also he moved his family to Iowa City with the view to give the children the benefit of its educational advantages. In 1867 he was proffered and accepted the chair of dental physiology, hygiene, and operative dentistry in the Missouri Dental College at St. Louis. At that time Dr. C. W. Spaulding retired to a farm, and Professor Chase succeeded him in his practice until his return, some six or seven years later.

Professor Chase's dental record is probably most marked by his prominent association in that movement begun in 1875 in favor of the more extended use of plastic filling-materials, which eventually was known from its organized "corps" of workers as "The New Departure," whose "creed" was so antagonistic to the "accepted" views of that time, and even very largely of the present. He embraced this work from the results of lines of experiments which he made in order to refute the Palmer theory of "compatibility," but which so convinced him of its *truth* as that he tendered his allegiance and eventually gave the celebrated "Article I," which was that "In proportion as teeth *need* saving, gold is the *worst* material to use."

Were it for no other reason than this, the name of Professor Henry S. Chase will be linked for all time with dental history.

Although a very positive, and for his view of the *truth*, a very aggressive man, he was yet of so kind and gentle and loveable a disposition as to be *universally* known as "Pa" Chase.

Among his plastic *confrères* he was known as "Old Putty," and the cognomen was held by them in unbounded respect and with an affection which was no less than love.

He leaves a widow, four sons, and a daughter, who surely inherit from their father a name *revered* by lovers of truth, progress, and reform.

J. Foster Flagg.

## DR. ALONZO BOICE.

Died, at Kingston, N. Y., February 2, 1898, Dr. Alonzo Boice, of Philadelphia.

Dr. Boice was born March 12, 1847, in the town of Canajoharie, Montgomery county, N. Y. His early education was obtained in the common schools of his native state, where he was noted for his proficiency in mathematics. As a boy, he was a champion trout fisher, and he early gave evidence of his well-known mechanical and artistic ability. At the age of fifteen he commenced the study of dentistry with Dr. M. M. Frisselle, at Kingston, N. Y. After several years' pupilage, his preceptor offered him a partnership in his business. This he declined, having already determined to take a course at a dental college. He graduated from the Philadelphia Dental College in 1869, and subsequently became demonstrator of mechanical dentistry in the same institution. Hundreds of students will gratefully remember his patience and his wise instruction.

He commenced practice in Philadelphia, where for nearly thirty years he labored untiringly and conscientiously for the elevation of his profession, and the benefit of a large clientèle. He was a member of the American Dental Association, Pennsylvania State Dental Society, Odontographic Society of Pennsylvania, Odontological Society of Pennsylvania, the Philadelphia County Dental Society, Historical Society of Pennsylvania, and the Union League of Philadelphia. He was also honorary member of the Central Dental Association of Northern New Jersey. In most of these societies he held, from time to time, various positions of honor and trust. By his death they lose a willing and active worker, and the profession at large one of its most honorable members. While his strong individuality often led him to antagonize the views of his associates, we think none of them ever doubted his sincerity or knew him to advocate a cause he did not believe was *right*. Having pronounced ideas on most subjects of common interest to the profession, and the courage to maintain them, he sometimes made enemies of those who, had they understood him and his motives better, would have been his staunchest friends.

But death closes the scene, and we feel that those who opposed him and those who supported him will unite in paying tribute to his many virtues.

Dr. Boice was unmarried. His parents and two sisters survive him. To them and his many friends we offer our sincere sympathy.

Charles E. Pike.

## DR. WILLIAM B. VAN VLECK.

Dr. Van Vleck died at Hudson, N. Y., January 14, 1898. He was born in Kinderhook on the 13th of November, 1818, and went to Hudson at the age of twenty-one. After pursuing the study of dentistry for some time in that city with his brother, Henry H. Van Vleck, he removed to New York, where for a year and a half he was a student under the late Harvey Beddell. He then returned to Hudson, where he spent the rest of his life, following for over half a century the duties of his profession.

In March, 1853, he married Anna King, of Hudson, the daughter of the late Captain Charles F. King, who survives him. Four sons were born to them—Dr. Charles K. Van Vleck, of Hudson; Fred. S. Van Vleck, of Brooklyn; Harry D. Van Vleck, deceased, and William J. Van Vleck, of New York.

Dr. Van Vleck was one of the organizers of the District Dental Society, and never lost interest in its welfare. He took the degree M.D.S. of the Dental Society of the State of New York on June 30, 1870. He was well known throughout the state, and always ranked among the leaders in his life's work. His son, Dr. Charles K. Van Vleck, was associated with him in the latter days of his active work, but about eight years ago ill health compelled him to abandon the profession he had followed so long and so faithfully.

Political honors did not appeal to him. The pleasures of public life could not overcome his love of home. Of a retiring nature, he often refused offers of public positions, and sought his family and friends. Old in years, he was young at heart, and the last days of his life saw no change in his kindly nature. His circle of friends was large, and though he had exceeded the allotted threescore years and ten, he did not allow increasing age to interfere with the friendships formed in other days. He was of the old school; ever the genial gentleman.

## PERISCOPE.

Fractures of the Lower Jaw and their Treatment.—In the treatment of fractures of the lower jaw it is important that the members of our profession should be thoroughly informed upon the subject. Many of you after leaving the school may never meet with a case, but a dentist, especially in the smaller cities or towns, is liable to be called upon at any time to treat a fracture, either in co-operation with the surgeon or alone.

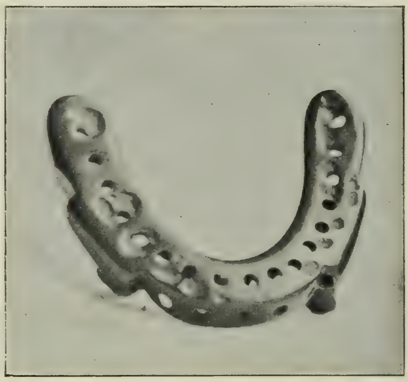
The surgeon finds that fractures of the lower jaw are the most troublesome to treat; he is not able to apply a splint in the same manner as in fractures of other bones. He finds that the numerous muscles which control the movements of the jaw tend to displace the fragments. The muscles which govern the tongue, larynx, and the neck, when used, also tend to displacement.

The displacement is produced primarily by the force which caused the accident, secondarily by muscular contraction. If the fracture be at the median line, there will be little or no displacement, as the muscles of the one side have no advantage over those of the other side.

The muscles which are most active in causing displacement are the masseter, the internal pterygoid, the mylo-hyoid, the genio-hyoid, and the genio-hypoglossus.

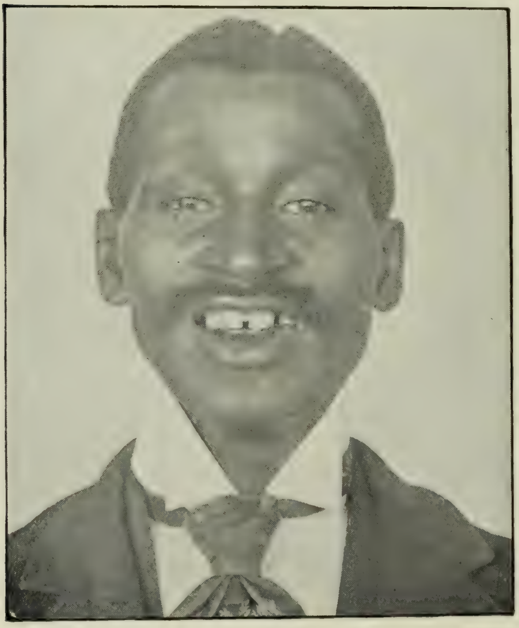
Any decided movement of the head, either rotary or otherwise, will have a tendency to displace the fragments. The simple acts of deglutition and speaking also tend to do the same. In the act of swallowing the larynx is elevated by the contraction of the hyoid muscles, which are attached to the tongue and the styloid process of the lower jaw. Before the contraction can take place the lower jaw must be fixed to the upper by the muscles which fix the mouth, when the act may be accomplished.

FIG. 1.



Simple vulcanite splint, with boxes vulcanized on each side.

FIG. 2.



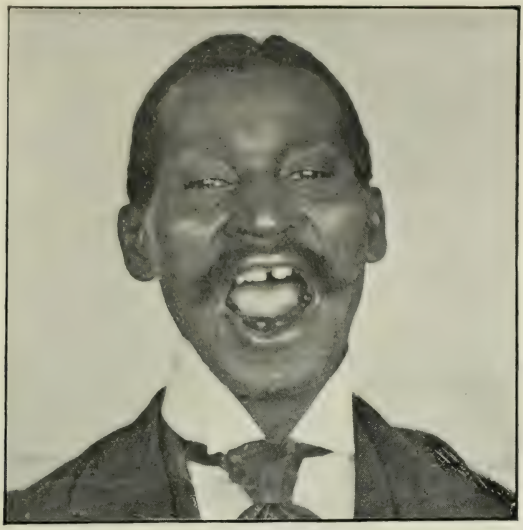
Fracture at the symphysis, showing splint on the lower teeth. Mouth closed.

I have not time this morning to go further into the action of the muscles in the various kinds of fractures.

The inferior maxillary, from its exposed position, its shape, and its office, is more subject to fracture than the superior maxillary bone.

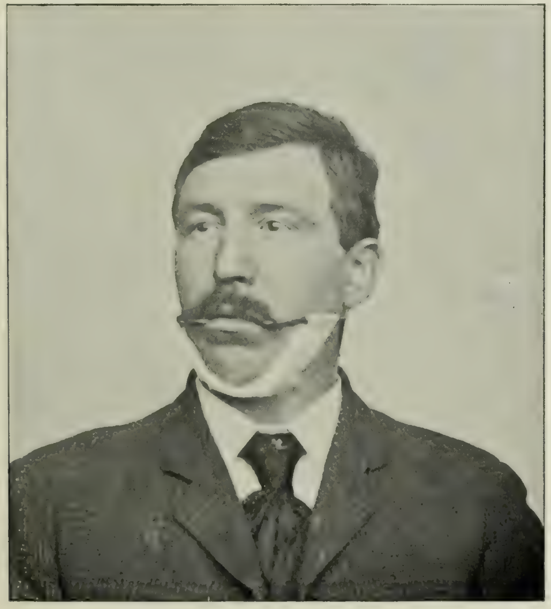
There is a wide difference as to the most frequent location of fractures of the jaw.

FIG. 3.



Shows mouth open, with the splint on the teeth, allowing patient to masticate food with but little discomfort.

FIG. 4.



Splint, arms and bandage.

Ehrichsen claims it occurs more frequently at the symphysis than at any other point, while Boyer makes the statement that it never occurs there, but at the weakest part of the bone,—that is, on each side of the symphysis; but as long ago as Hippocrates, fracture at the symphysis was known and recognized.

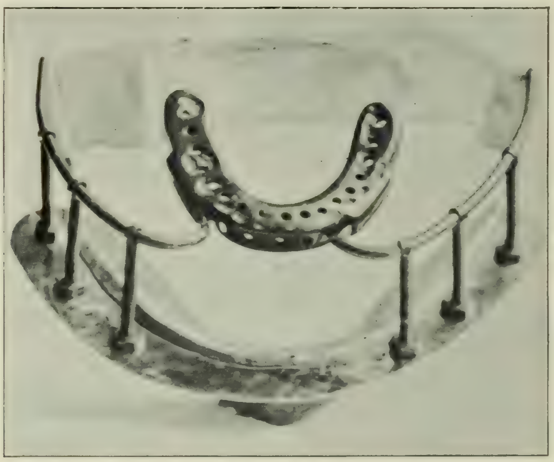
Garretson says the weakest part is on a line with the roots of the cuspid, with an unbroken dental arch, but where the teeth have been removed the weakest part may be at the point of their removal.

Gibson claims that age has much to do with location, and that in the young it is commonly at the symphysis.

From my experience, I have found that the location of the fracture depends upon the direction of the force necessary to cause a fracture and the position of the teeth remaining in the jaw.

Fractures of the ramus are rare. This exemption may be accounted for by the protection given by the muscles and the integument, and the natural strength of the bone; also, the force of the blow is often broken by the joint slipping out of place. Fracture at the ramus is more liable to occur in patients whose upper teeth are all missing, or who wear a poorly-fitting upper plate.

FIG. 5.



Splint, arms and chin-piece. Pressure is obtained by tightening the screw-bolts which run from the arms to the chin-piece.

Many cases of fractured neck of the condyle are recorded, and, as a rule, are most serious, as you may get fatal brain complications.

Fractures of the alveoli are common, but are not considered serious unless unusually extensive.

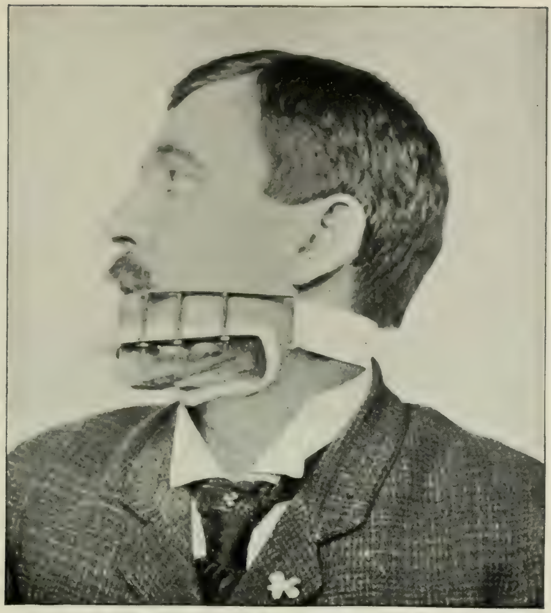
Fractures are simple when the bone only is divided without piercing the integuments.

Fractures are compound when the injury is accompanied by laceration of tissue through which there is a communication between the external air and the fracture. This form is most common, and the laceration exists upon the lingual side; or, when the integument is lacerated, it is most generally from gunshot wounds.

Fractures are comminuted when the bone is broken or crushed into several pieces at the same point and communicating with each other.

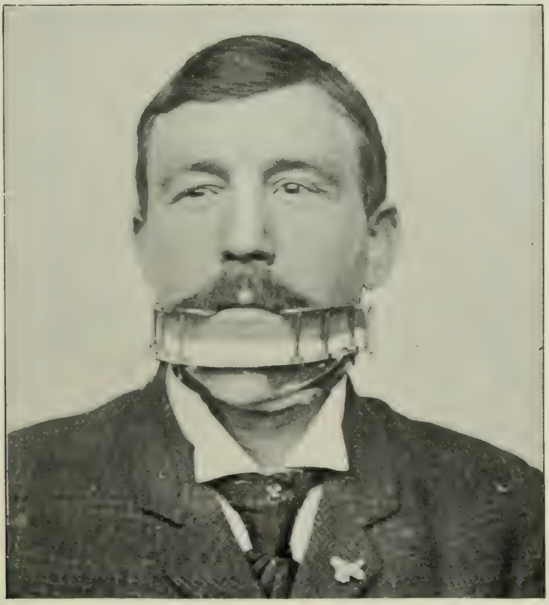
Fractures of the jaw are unmistakable, the prominent symptoms being pain, swelling, drooling, and crepitus, with but little hemorrhage unless the fracture is compound. There is also displacement of the fragments, which the irregularity in the line of the teeth plainly shows. You may also have increased salivation. Of course, the loss of function is apparent when the patient is unable to use the jaw.

FIG. 6.



Side view of splint, arms and chin-piece in position.

FIG. 7.



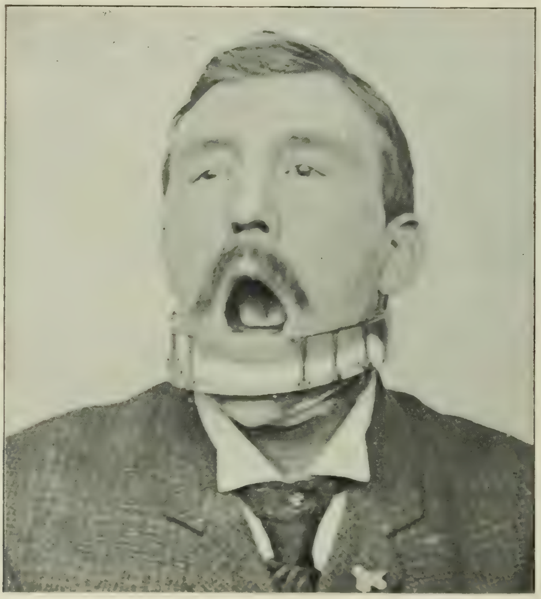
Front view.

If the inferior dental nerves and vessels are injured you may get paralysis, facial spasms, etc. Drs. St. George, Holmes, and Ehrichsen, who have had some experience in such cases, never met with any paralysis connected with the injury to the soft parts; whilst Boyer, Berard, Heath, and Chelius in their works claim the opposite.

When any doubt exists as to the location of a fracture of the lower jaw, grasp the bone on each side with the forefingers introduced into the mouth and resting upon the teeth; you will then have no difficulty in recognizing the false point of motion or crepitus between the fragments.

Fractures of the lower jaw are of quite frequent occurrence, and are generally the result of direct violence. In men a fall, a kick from a horse, or a blow from a policeman's club or from the fist are the prominent causes. In women a blow from the husband has been the cause in every case we have had at the school.

FIG. 8.



Appliance on, showing how the mouth can be opened to enable patient to eat, drink, etc.

In my opinion, the dentist, and not the physician or surgeon, is the proper person to treat all fractures of the jaw. Dentists should emphasize this fact, and impress it upon the public and the physicians. That the hospitals are recognizing this fact is proven by the number of cases we have had here during the past few years.

In the early days various methods of treatment were resorted to. The teeth were not considered as essential to the health, comfort, and good looks of the patient as now. It did not matter if the contour of the face was marred by the displacement of the fragments. If the parts grew together fairly well it was of little consequence if the articulation was good, bad, or indifferent. If one or more teeth were prominent and made the displacement noticeable, the forceps in the hands of the surgeon soon remedied that, and the patient was thankful to get through alive.

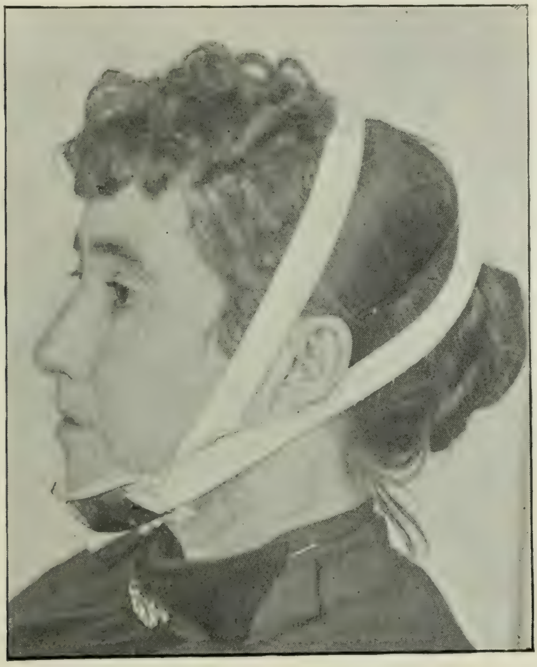
The physician treats a case of fracture of the jaw by applying a four-tailed bandage, or by wiring the parts together. The dentist treats one by means of a dental splint nicely constructed and properly applied, which is far superior to bandaging or wiring. Physicians seem to be unaware that the comfort and interests of their patients would be better served by calling in the services of a dentist.

The application of a correctly made splint does not interfere with the functions of the jaw, and in a great many cases the patient can masticate with comfort, being able to open and close the mouth. This he cannot do when bandages are used.

The best treatment requires the readjustment of the fractured parts, and fixation, and that the fixation of the bone shall not interfere with its functions, nor with the required dressing of an associated wound.

When a patient with a fractured jaw comes to us we thoroughly wash the mouth with an antiseptic solution, any very loose teeth are removed, and the teeth cleansed from tartar.

FIG. 9.



Fracture of the ascending ramus. Patient without any teeth. Inserted an interdental splint to maintain correct relationship between upper and lower jaws, also bandage and small chin-piece.

An impression of the upper jaw is taken in modelling composition, and one of the lower or fractured jaw in modelling composition or plaster. No attempt is made to put the fragments in proper position.

Plaster casts are made, on which the lines of fracture are clearly indicated. With a fine saw the cast is cut on these lines, and the lower teeth are articulated with the plaster cast of the upper jaw. Plaster is run around to hold the severed portion in position, and then both upper and lower casts are put upon an articulator.

The process of waxing up and making a vulcanite splint is similar to that of making a vulcanite plate, and is familiar to you all.

I find that for fractures at the symphysis the simple dental splint is sufficient. (Figs. 1, 2, and 3.)

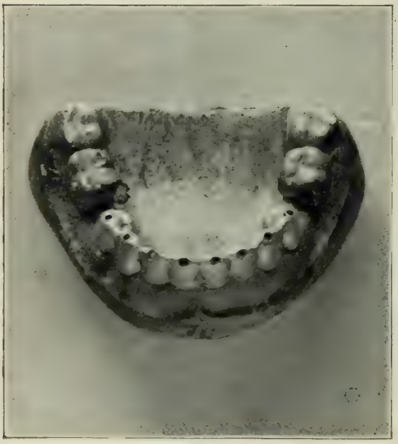
I always vulcanize on the sides of the splint, boxes into which wire arms can be inserted. These wire arms are bent at the corners of the mouth and extend back toward the ears; a bandage from each arm and under the chin gives the pressure required to hold the parts in position. (Fig. 4.)

If the jaw is fractured in the region of the molars, considerable pressure is required to get the parts in position. This I obtain by the addition of a mental splint or chin-piece. (Fig. 5.)

This is well padded and by a number of screw-bolts attached to the wire arms, and the pressure is gradually increased until the fragments are in the correct position. (Figs. 6, 7, 8.)

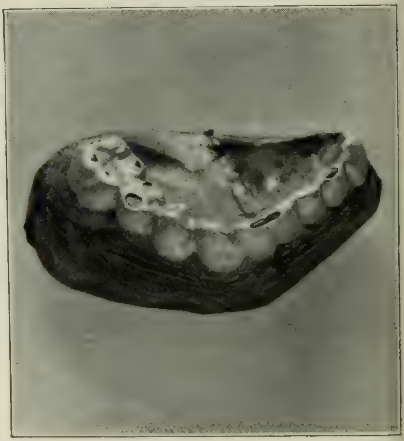
In one case that I had during the past year the patient, who wore an upper and lower set of artificial teeth, had the lower jaw fractured on the right side at the cuspid region and on the left at the first molar. Using the lower plate for a splint, boxes were vulcanized on the side, the arms and chin-piece attached, and a good result was obtained.

FIG. 10.



For simple fracture. A continuous capping of gold, aluminum, or other metal cemented onto the teeth.

FIG. 11.



Fracture between cuspid and lateral. An aluminum splint.

In another case in which the patient did not have any teeth (Fig. 9), the fracture was at the ramus. As can be readily imagined, this case necessitated a bandage; but in order to maintain the correct relationship between the upper and lower jaws an interdental splint, with an opening for the reception of food, was inserted, and the patient bandaged. Fourteen days later the splint was replaced by an upper and lower set of teeth, and ten days later the patient was dismissed, the union being complete.

That the best-constructed splint may be a failure was forcibly brought to my attention in the case of one patient who came to the infirmary with a fracture between the left lower cuspid and bicuspid, and at the angle of the jaw on the right side. Considerable pus exuded from a sinus on the left side. A vulcanite splint with metal chin-piece was applied, and at the end of a week the flow of pus had apparently ceased.

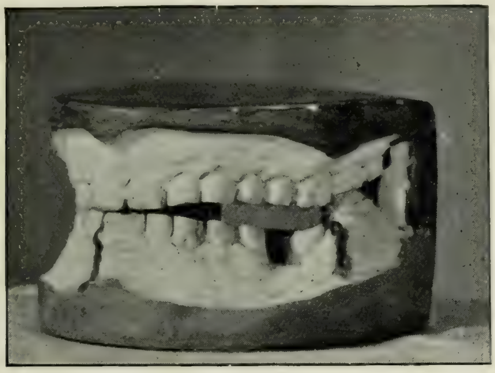
On the ninth day the splint was not in position, the mouth was foul, and pus freely flowing again. Believing that the patient did not properly cleanse his mouth, and being unable to explain the failure of the splint, I removed it and applied a four-tailed bandage.

Annoyed and perplexed, I made inquiries, and was informed by an acquaintance of the patient that he with a pair of pliers had loosened the appliance after leaving the infirmary and tightened it again before coming to see us.

The patient at first stoutly denied doing this, but finally admitted that he did, as he could not see why it was necessary to keep such pressure on his jaw.

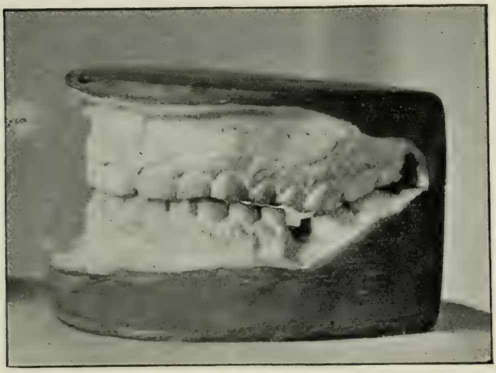
The great disadvantage that we as dentists labor under in the treatment of some of these cases is that we have no place where patients who are in need of nourishment can be attended. For instance, a homeless patient, or one who boards out in a café, cannot very well sit down to table with this appliance on his jaw. Or the patient may be feverish and need constant attention; this he cannot get except in some place where he will be looked after.

FIG. 12*a*.



Plaster model, showing articulation of a fractured jaw before treatment.

FIG. 12*b*.



Plaster model of same jaw, showing articulation after treatment.

I have in the cases of some private patients used a modification of the Angle system, but prefer wider bands. I do not approve of banding the lower to the upper teeth except in a few cases, the objections being that in order to feed the patient it would often be necessary to extract a tooth, and that you do not give the patient any use of the lower jaw.

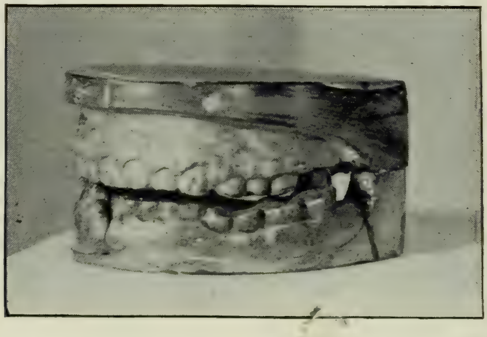
There are many ways of treating a fracture of the jaw other than bandaging, which is the natural device of the sufferer. Barton's, Gibson's, Hunter's, and the four-tailed bandage have done excellent service.

In several cases where the fracture was at the symphysis, with but little displacement, I have used a continuous cap of gold or aluminum cemented onto the teeth. The cap is struck up by die and counter-die from a reconstructed plaster cast of the fractured jaw. This is very neat, is not noticeable, and gives excellent results. (Figs. 10, 11.)

Wiring the parts together has been tried frequently, and often successfully. Wiring the teeth has often been a dismal failure.

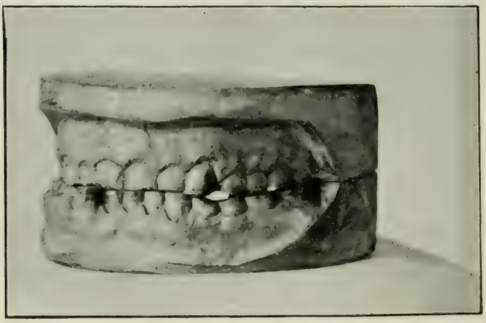
Metal plates and ligatures have been used with more or less success.

FIG. 13*a*.



Plaster model of jaw, showing displacement before treatment.

FIG. 13*b*.



Plaster model, showing articulation after treatment.

I have not perhaps given you anything new, but I want to impress upon you the fact that the dentist can do this work better than any surgeon.

We utilize the work of our predecessors, and perhaps simplify it.

I believe that the time is coming when the treatment of fractures of the jaw will be so systematized and simplified that any dentist will be able to handle the most difficult cases.

During my eight years' service at the school I have found that the average student, under proper instruction, quickly grasps the methods to be pursued in the treatment of any deformity, many of which are more complicated than the treatment of a fracture of the jaw.

I have here models of twenty-eight cases showing condition before and after treatment, which I invite you to inspect.

To conclude, I am firmly convinced that the best treatment of a fractured jaw requires the services of a dentist who can make a splint or appliance adapted for each case. (Figs. 12, 13.)—*A lecture delivered at the Dental School of Harvard University by Dr. P. W. Moriarty, instructor in the mechanical treatment of fractured jaws and cleft-palate in the Dental School of Harvard University;* from *Boston Medical and Surgical Journal.*

PERSPIRING HANDS.—Probably no local application will be of much use to remedy this, since the perspiration is the effect of some nervous derangement. A solution of chromic acid, five grains to the ounce, used several times a day, may help to dry the palms, or the following: Ammonium chlorid, one drachm; tincture of belladonna, four drachms; spirit of camphor, two drachms; distilled water to four fluidounces. Rub over the hands with a little of this, and allow to dry on, but tonic treatment, plenty of cold water, including a cold spinal douche every morning, and brisk outdoor exercise will do more good. Gloves should not be worn at all,—at least until cured, and then only woolen ones should be used.—*Pharmaceutical Journal.*

THE BEST ANTILITHIC REMEDY.—The excessive production and deficient elimination of uric acid from the system is now held responsible for the causation of many affections formerly attributed to other factors. The modern views as to the pathology of the uric diathesis have necessarily exerted a material influence upon the therapeutics of the various conditions grouped under this heading. Greater attention is now given to the dietetic and hygienic management of patients afflicted with this diathesis, for it is well recognized that in this way only the over-production of uric acid can be successfully prevented. There are many cases, however, in which the imperfect elimination of this substance, rather than its excessive formation, is responsible for the existing disturbance. It is here that the administration of the new uric solvent, lycetol, will be promptly followed by an augmented excretion of uric acid with rapid relief of the symptoms. Dr. S. M. Ward *(Daily Lancet)* states that in lithiasis, gout, rheumatism, and in those little understood, vague, and painful affections resembling neuralgia, though not following the nerve courses, lycetol has been of great service in his practice. He cites a characteristic case, in which, after prolonged use of lithia waters had given but indifferent results, rapid benefit was derived from the employment of lycetol, which must be considered as the best antilithic as yet presented to the medical profession.—*Dietetic and Hygienic Gazette.*

A POWDER FOR DIFFICULT DENTITION.—Dr. S. Santoire, of Brooklyn, says that he has used the following formula with great success for over twenty years in hospital and private practice:

℞—James's powder,
Calomel, āā 1 grain;
Sodium bicarbonate, 12 grains;
Dover's powder, 2 grains;
Sugar of milk, 12 grains.

M. Divide into twelve powders. To a child from six months to two years old a powder may be given every four or five hours, in syrup or in milk and water.—*New York Medical Journal.*

ETHER ANESTHESIA.—In a series of forty cases, Brouner employed an average of 2.4 oz. of the vapor for each operation (the average time of which was about forty-eight minutes), and but 2.2 oz. of ether to produce complete anesthesia. There is no question but that the bad sequelæ of etherization,—namely nausea, vomiting, bronchial trouble, and nephritis, occur in direct proportion to the amount of ether employed. The best results are obtained by gradual, quiet administration; the so-called "forced method" of etherization is unnecessary, cruel, and ofttimes injurious.—*Philada. Med. Journal.*

EUCAIN IN DENTAL PRACTICE.—Blotz reports very favorably on eucain hydrochlorate as an anesthetic in dental work, after having employed it in over two hundred cases. From one to one and one-half grains in ten per cent. solution is sufficient for five contiguous teeth. If the teeth to be operated on are scattered, three-tenths of a grain will generally be found sufficient for each tooth. A total of three grains should not, if possible, be exceeded. Insensibility to pain supervenes in from two to five minutes. The only unpleasant symptom observed is the swelling of the injected parts, but this may be avoided to a great extent by sterilizing the gums with hydrogen peroxid before puncture, and subsequently pressing out the liquid from the injected area. The author quotes cases where twenty-one roots, and ten and fourteen teeth respectively, were extracted painlessly in one sitting. Eucain has the advantage of being effective in periostitis where cocain frequently fails.—*Brit. Journ. Dent. Sci.*, after *Zahn. Ref.*

## HINTS, QUERIES, AND COMMENTS.

WHAT has become of the advocates of implantation who were so vociferous a few years since? Has the subject become *tooth in* to talk about?—CYCLOPS.

TO THE EDITOR OF THE DENTAL COSMOS:

*Sir*,—I have read with some care and much interest the various articles appearing recently in the leading dental magazines bearing upon the relation of the colleges to the boards.

To the best of my recollection, these articles have been written by men interested in one or the other of these institutions, while what is usually termed "the profession at large" has thus far kept silence.

In other words, the mills and not the grists have been doing the talking. This being the case, I venture to say a word with regard to my own recent experiences as student and candidate for admission to practice.

I graduated from the Dental School of Harvard University in the class of 1894, after spending three years of nine months each in study at that institution.

In December, 1893, six months before the time of my probable graduation, I applied for examination before the Massachusetts State Board of Dental Examiners. I am convinced that this examination was fair; it was certainly thorough, and most of the questions asked had a more or less direct bearing on some department of dentistry. To demonstrate our ability as operators, each candidate had to insert a gold filling of considerable difficulty, under direct scrutiny of the examiners. Of some thirty candidates who presented themselves at this session of the board, I believe thirteen were granted certificates. I was one among the number.

Of my classmates who took this examination with me, some were successful, while others failed. Some of those who failed on the State Board examination also failed in their finals at school, while several who were successful at the State Board could not qualify for graduation, even after six months' additional study and experience, thus showing that in the case of the institution in question the standard for graduation was measurably higher than that for admission to practice at the hands of the State Board. This is as it should be.

I well remember a remark made to me at the close of my State Board experience by the late E. V. McLeod, D.D.S. (as fair a man as ever sat in judgment to guard the rights of the people.) He said, "The State Board has been criticised more or less for granting certificates to undergraduates. However, we are helpless in the matter. When a man presents himself who, in our judgment, is qualified to practice, we have no choice but to license. It is none of our business, under the existing law, whether he has ever graduated or not." In corroboration of this statement, I happen to know that seven graduates of "schools in good standing" failed in the session of the board I have spoken of. From which facts I draw the conclusion that these institutions can have no possible quarrel with each other.

The true office of the college must ever be to secure the highest possible efficiency of its graduates, and to the graduates of such a college the passing of any "State Board examination" is a mere matter of form and need have no terrors.

The true office of the "State Board" is to protect the public from the ravages of the grossly incompetent who have, by some means or other (it happens right along, but, of course, no one knows how), obtained a diploma, but for some strange reason are highly indignant, not to say downright uneasy, when called upon to give evidence of professional ability before the tribunal of a State Board.

In any event, whether honest or corrupt, with high motives or low, whether run to make money and poor dentists on the one hand, or by ward politicians and political "pulls" on the other, it is difficult to see how these institutions can injure each other.

The wrong done by either of them must, of necessity, fall first upon the student or candidate for admission to practice, next upon the public, and, in due course of time, back upon the particular institution committing it.

PEORIA, ILL., January 22, 1898. ARTHUR G. SMITH, D.M.D.

TO THE EDITOR OF THE DENTAL COSMOS:

*Sir*,—Will you allow me, in justice to myself, to state that I am not unacquainted with Dr. B. J. Cigrand's interesting and valuable volume, entitled "The Rise, Fall, and Revival of Dental Prosthesis," of which it was necessary to publish a second edition in 1893?

This author deserves special credit for his earnest efforts in the direction of a more general interest in dental history.

It would seem impossible for any one to write on this subject without commending Dr. Cigrand's work, but, owing to an unfortunate oversight on my part, I seem to have been able to do so in the January number.

January 31, 1898. CHARLES MCMANUS.

TO THE EDITOR OF THE DENTAL COSMOS:

*Sir*,—The January number of the DENTAL COSMOS, page 36, contains a mild criticism by Dr. G. B. Squires, of Boston, in regard to a statement made by the undersigned in an address delivered before the American Dental Association at its last meeting, which deserves a courteous reply.

If the premises in that statement be accepted,—and Mr. S. kindly accepts the major proposition,—that "acids whose electro-negative radicals are elementary confer names on salts which terminate in *ide* (*id*)," and inasmuch as HCl belongs to this class of acids, the conclusion is evident that the names of *all* its salts, whether metallic or alkaloidal, should end in *id;* and if this rule of chemical nomenclature be correct, then the mere fact that alkaloidal salts are formed by direct union of the alkaloid with the acid, without displacement of H, is no reason why the rule should be violated by terminating their names in *ate*. Moreover, ammonia, of which all the alkaloids, natural and artificial, are said to be derivatives, combines with acids in the same direct way that alkaloids do,—*i.e.*, without the displacement of H. Yet the names of its salts with the halogen acids end in *id;* accordingly, neither the retention nor substitution of the acid H changes the rule; therefore *id* pertains to the salts of binary acids, whereas *ate* and *ite* pertain only to those salts whose parent acids have compound negative radicals, as, example, chloric ($HClO_3$), nitric ($HNO_3$), and nitrous ($HNO_2$) acids, respectively.

In view of the growing importance of animal alkaloids to medical and dental chemistry, it is worth while to insist on uniformity of nomenclature when applied to their present known and possible future combinations with our different families of acids.

That the union between an alkaloid and a binary acid—*e.g.*, HCl, etc.—produces a child the ending of whose surname in *id* no one, to my knowledge, denies; while many deem *ate*, as applied to the same subject, very much like the ideal "woods colt" of Kentucky, without a known paternal ancestor.

HCl is the recognized progenitor or type of chlor*ids*, and $HClO_3$ the type of all chlor*ates;* hence cocain hydrochlor*id* is the legitimate name of $C_{17}H_{21}NO_4$, HCl; therefore, cocain hydrochlor*ate* is a misnomer, inasmuch as it is *not* a salt of chloric acid.

We should not, in all justice, rob chloric acid of its own high prerogatives. What name, for instance, can be given to the offspring that may be produced by its legal marriage, in the near future, to the possible toxins and antitoxins and other alkaloids, if we continue to misappropriate the name that it alone has the scientific right to confer?

In regard to the elimination of the final *e* from chemical names, save those of the unsaturated hydrocarbons, this change does not alter the apparent derivation or status of the substances involved, therefore the suggestion may be either indorsed or not accepted with almost equal propriety by lovers of true science. Truly scientific and yet conservative journals, however, like the DENTAL COSMOS, in touch with the progressive spirit of the times, were among the first to adopt the innovation.

1555 MADISON AVENUE, Covington, Ky. J S. CASSIDY, D.D.S.

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# LIST OF UNITED STATES PATENTS

## PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING JANUARY, 1898.

*January 4.*—No. 596,497, to JAMES A. GRIFFITHS. Safety attachments for valves.
" " No. 596,667, to N. M. ROSE. Dental chair.
" " No. 596,697, to L. E. CUSTER. Electric oven.
" *11.*—No. 597,002, to E. W. JEWELL. Graphite rheostat.
" " No. 597,099, to H. M. CARROLL. Artificial tooth.
" " No. 597,235, to O. B. BRANN. Wetter and wiper for dental grindstones.
" " No. 597,359, to G. E. JOHNSON. Fountain spittoon.
" *18.*—No. 597,384, to GEO. BOOTH. Dental cuspidor.
" " No. 597,469, to F. L. MARSHALL. Dental plugger.
" " No. 597,582, to M. A. KNAPP. Teeth regulator.
" *25.*—No. 597,719, to W. A. JOHNSTON and A. W. BROWNE. Gas-administering apparatus.
" " No. 597,781, to PAUL RING. Apparatus for administering gas.

# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

**Ambler** (H. L.) Tin-foil and its combination for filling teeth. Phila., 1897, S. S. White Dental Mfg. Co., 100 p. 8°.

**Ayasse** (M.) Etude historique et critique des procédés de restauration du rebord alvéolaire dans le bec-le-lièvre compliqué. Par., 1897, 67 p. 8°.*

**Berger** (P.) Du traite chirurgical du prognathisme. Lyon, 1897, 58 p. 8°.*

**Denarie** (J.) De quelques méthodes simples pour l'ablation des polypes naso-pharyngiens. Lyon, 1897, A.-H. Storck, 62 p. 8°. No. 135.*

**Dubourdien** (Jean-Emile.) Des tumeurs benignes de la base de la langue et de quelques antres affections à allure benigne de la mème région (Syphilome, hypertrophie de la amygdale linguale, mycosis). Bordeaux, 1897, Y. Cadoret, 47 p. 8°.*

**Fremont** (Albert-Jules.) Morcellement des amygdales. Par., 1897, 54 p. 8°.*

**Gourdon** (J. J. M. L.) Traitement du bec-le-lièvre complique. Bordeaux, 1897, Cadoret, 54 p., 10 pl. 8°.*

**Hernette** (Ferdinand-Antoine-Jules-Nicolas.) L'eucaine. Contribution à l'étude de son action physiologique. De son emploi comme anesthésique local en chirurgie. Par., 1897, 51 p. 8°.*

**Jung** (C.) Lehrbuch der zahnärztlichen Technik Eine Handbuch für Studirende. Leipz. u. Wien, 1897, F. Deuticke, 196 p. 8°.

**Koch** (W.) Ueber Parotis-Tumoren. [Freiburg.] Wiesbaden, 1897, 30 p. 8°.*

**Kronenbrecher** (J.) Zahnärzte, Juristen, Pfuscher. Ein Lehrbuch der Zahnheilkunde fur Aerzte und Laien. Hamb., 1897, Lange & Wendt., 310 p. 8°.

**Malot** (Louis.) Des injections souscutanees du gaiacol chloroformé comme analgésique local. Par., 1897, 44 p. 8°.*

**Morisot** (Eugène.) Des abcès aigus de la moitié anterieure de la langue. Bordeaux, 1897, Y. Cadoret, 42 p. 8°.*

**Nash** (H. S.) Loosening teeth or chronic alveolitis (Pyorrhoea alveolaris, phagedenic pericementitis, Riggs disease, etc.) its causes, clinical history and treatment; with general directions for the care of the teeth; in two volumes. Vol. i. N. Y., 1897, B. F. Welles, 299 p. 12°.

**O'Followell** (L.) L'anesthesie locale par le gaiacol, le carbonate de gaiacol et le gaiacyl. Par., 1897, 148 p. 8°.*

**Pitance** (Jean-Baptiste.) Etude sur les tumeurs mixtes du voile du palais. Par., 1897, 127 p. 8°.*

**Planche** (R.) La perlèche. Par., 1897, 48 p. 8°.*

**Prevost** (C. A.) Mycosis du pharynx. Par., 1897, 30 p. 8°.*

**Rubin** (Richard.) Beitrag zur Casuistik der Resektion Sarcomatöser Oberkiefer. Würzburg, 1897, Stahel, 27 p. 8°.*

---

**Ambler** (H. L.) Ex-section of the superior maxillary nerve, old and new methods. Ohio Dent. J., Toledo, 1898, xviii, 12-18.—**Amoedo** (O.) Die Rolle der Zahnärzte in der Identifizirung der opfer der Katastrophe im "Wohlthätigkeits-Bazar" in Paris am 4. Mai. 1897. J. f. Zahnheilk., Berl., 1897, xii, No. 44.—**André.** Des troubles de la sécrétion salivaire dans les paralysies faciales centrales et périphérique. Gaz. hebd. de méd., Par., 1897, n. s., ii, 1213-1215.—**Appeal** (An) to Congress against dental patents. Items Interest, N. Y., 1898, xx, 8-18.—**Armstrong** (G. E.) Excision of the tongue. Montreal M. J., 1898, xxvii, 61-63.—**B.** (F. A.) Method of shortening the period of pain during the action of arsenical applications. Am. Dent. Weekly, Atlanta, 1898, i, 233.—**Balzer** (F.) **et V. Griffon.** Stomatite diphteroïde Impétigineuse à streptocoques. Rev. mens. d. mal. de l'enf., Par., 1898, xvi, 23-31.—**Barth** (A.) Rachenmandel und Ohr. Monatschr. f. Ohrenh., Berl., 1897, xxxi, 473-479.—**von Bartha** (G.) Carcinoma buccae I. sin. Exstirpation Plastik. Ungar. med. Presse, Budapest, 1898, iii, 5-9.—**Barton** (L. F.) Plastic fillings. Dental Rec., Lond., 1897, xvii, 537-547.—**Bauby** (D.) Complications orbitaires des empyèmes du sinus maxillaire. Arch. d'opht., Par., 1897, xvii, 770-782.—**Belcher** (W. W.) Shall the dentist advertise. Items Interest, N. Y., 1898, xx, 3-6.—**Benedict** (A. L.) Carbolic acid. Dental Pract., Buffalo, 1898, xxix, 6-8.—**Bennett** (L. W.) The mechanical treatment of cleft palate. Brit. J. Dent. Sc., Lond., 1898, xli. 8-12.—**Berger** (F.) Die Zahne von gerichtsärztlichen Standpunkt. Pest med.-chir. Presse, Budapest, 1897, xxxiii, 1143; 1187; 1215.—**Bergonié.** Traitement électrique palliatif de la névralgie du trijumeau (tic douloureaux de la face). Presse méd., Par., 1898, i, 5–8.—**Berlyn** (A.) Syphilitic necrosis of the alveolar process. Brit. J. Dent. Sc., Lond., 1898, xli, 13.—**Berndt** (F.) Improvisirter Ersatz des Knochendefects nach halbseitiger Unterkiefer-Resection. (exarticulation). Arch. f. klin. Chir., Berl., 1898, lvi, 208–216.—**Biondi** (D.) Contributo alla plastica endorale. Clin. chir., Milano, 1897, v, 353–365.—**Bocci** (B.) **e A. Moscucci.** La fonction diastasique dans la salive centrifugée. Arch. ital. de biol., Turin, 1897–8, xxviii, 72–76.—**Bockhorn** (M.) Ein Fall von Tuberculose der Parotis. (Beitrag zur chirurgischen Pathologie der Parotis.) Arch. f. klin. Chir., Berl., 1898, lvi, 189–201.—**Bottome** (F. A.) Congestion at the base of the tongue. Laryngoscope, St. Louis, 1898, iv, 31–33.—**Bowen** (J. J.) Hypertrophy of the lingual tonsil. N. York M. J., 1897, lxvi, 872.—**Boyd** (H. D.) A method of hermetically and antiseptically sealing apical ends of root canals. Items Interest, N. Y., 1898, xx, 1–3.—**Briegleb** (K.) Ueber Schleich's Infiltrations-Anästhesie. Kinder-Arzt, Leipz., 1897, viii, 244; 273. ——— Die Schleich'sche Infiltrations-Anästhesie und der practische Arzt. Therap. Monatsh., Berl., 1897, xi, 650–654.—**Broca** (A.) Hypertrophie congénitale et progressive des deux glandes sublinguales chez un enfant nouveau-né, par J. Braquehaye et J. Sabrazès. Bull. et mém. Soc. de chir. de Par., 1897, n. s., xxiii, 567.—**Brocq** (L.) **et L. Bernard.** Hemato-lymphangiome de la langue et du voile du palais. Ann. de dermat. et syph., Par., 1897, 3. s., viii, 1113–1115. ——— *Also:* Bull. Soc. franç de dermat. et syph., Par., 1897, viii, 395–397.—**Brophy** (T. W.) Surgical treatment of harelip. Dental Rev., Chicago, 1898, xii, 23–29.—**Brubacher** (H.) Experimentelle Studie über Wurzelhautentzündung. Oesterr.-ungar. Vrtljschr. f. Zahnh., Wien, 1897, xiii, 409–445, 2 pl.—**de Buck** (D.) **en van der Linden.** Een geval van mondtuberculose. [A case of mouth tuberculosis.] Med. Weekbl., Amst., 1897–8, iv, 565–567.—**Bulin** (A.) Meine Erfahrungen über die Artikulation oder Bessabnahme. Zahntech. Reform, Berl., 1897, xvii, 436–442.—**Busch.** Ueber Verschmelzung und Verwachsung der Zähne des Milchgebisses und des bleibenden Gebisses. Deutsche Monatschr. f. Zahnh., Leipz., 1897, xv, 529–544.—**Caradonna** (G.) Considerazioni preliminaire intorno ai crani e cervelli di cane. Mod. zooiatro, Torino, 1897, viii, 365–370.—**Carden** (A. E.) Sensitive dentine. Dental Rec., Lond., 1898, xviii, 7–11.—**Carwardine** (T.) The morphology and pathology of the pharyngeal pouch of Rathke. Bristol M.-Chir. J., 1897, xv, 310–317.—**Case** (C. S.) A new retaining appliance. Ohio Dent. J., Toledo, 1898, xviii, 1–7.—**Chittenden** (C. C.) The use of soft foil. Dental Digest, Chicago, 1897, iii, 781–785.—**Christ** (J.) Ekzem nach Kreolinbehandlung. Deutsche Monatschr. f. Zahnh., Leipz., 1897, xv, 545.—**Chudovszky** (M.) A prothesis jelentösége állkapocs-resectióknal. [The significance of prothesis in resection of the jaw.] Orvosi hetil., Budapest, 1898, xlii, 11.—**Claisse** (P.) **et E. Dupré.** La parotide chez les saturnins. Presse méd., Par., 1897, ii, 369.—**Coates** (A. N.) One piece gold crowns. Ohio Dent. J., Toledo, 1898, xviii, 8–10.—**Coester.** Eine Epidemie von Maul- und Klauenseuche im Kreise Goldberg-Haynau und ihr Einfluss auf dessen Bewohner. Ztschr. f. Med.-Beamte, Berl., 1897, x, 825–836.—**Cogswell** (A. C.) Nicotiana. Dominion Dent. J., Toronto, 1898, x, 1–8.—**Cox** (C. W.) The artistic and mechanical in dentistry. Dental Rev., Chicago, 1898, xii, 33–38.—**Crews** (J. T.) Cystic tumor of the alveolar process. Dental Headlight, Nashville, 1898, xix, 1–3.—**Crutcher** (R. D.) Gold filling lined with soft foil and finished with cohesive foil. *Ibid:* 3–5.—**Dalma** (D.) Stomatitis gangrænosa. Magyar fogász. szemle. A stomatol. [etc.], Budapest, 1897–8, ii, 15–17.—**Danlos.** Mélanodermie parasitaire avec plaques pigmentées sur la muqueuse buccale. Ann. de dermat. et syph., Par., 1897, 3. s., viii, 1284.—**Davenport** (W. S.) Spring levers for regulating teeth. Internat. Dent. J., Phila., 1898, xix, 9. —**Depage** (A.) Un cas de résection du ganglion de Gasser. Bull. Acad. roy. de méd. de Belg., Brux., 1897, 4. s., xi, 687–694. ——— Un cas de reséction de la troisième branche du trijumeau à la sortie du trou ovale. *Ibid:* 694.—**D'Ercole** (V.) Due casi di balbuzie d'alto grado combinata rispettivamente con rotacismo e sigmatismo interdentale. Gazz. med. di Torino, 1897, xlviii, 761–767.—Δεδμος. Desmos. Devoted to the fraternity by the supreme chapter. Allison William Haidle, Editor, Ann Arbor, Michigan. Quarterly. v. 2–4, 1896–98.—**Dubar** (L.) Kyste dermoïde de la base de la langue; accès de suffocation nécessitant la trachéotomie; extirpation du kyste rendu facile par la section mediane de l'os hyoïde, qui est ensuite réuni au moyen d'une suture au fil d'argent; guérison. Echo méd. du nord, Lille, 1897, i, 592–594.—**Dyer** (I.) A case of xanthelasma (?) of the upper and lower lips and of the buccal mucous membrane. J. Cutan. & Genito-Urin. Dis., N. Y., 1898, xvi, 23–25.—**Eberson** (M.) Ueber colorirten Geschmack. Wien. med. Presse, 1897, xxxviii, 1541.—**Edward** (J. H.) Loss of nervous power, resulting from a carious tooth. J. Brit. Dent. Ass., Lond., 1897, xviii, 763.—**Elder** (J. M.) Removal of foreign body from cheek. Montreal M. J., 1898, xxvii, 66.—**Faught** (L. A.) **and G. C. Brown.** Some statistical studies of dental education in the United States. Items Interest, N. Y., 1898, xx, 19–27.—**Fiset** (L. N. J.) De l'hypertrophie des amygdales et de son traitement. Rev. méd., Quebec, 1897, i, 161; 169.—**Frey** (O.) Klinische Beiträge zur Aktinomykose. Beitr. z. klin. Chir., Tubing., 1897, xix, 577–608.—**Gaddes** (T.) How can we best assist the Association in maintaining the provisions of the dentists act. J. Brit. Dent. Ass., Lond., 1897, xviii, 758–760.—**Gauthier**. Fracture du col du condyle du maxillaire inférieur par coup de pied de cheval. Gaz. méd. de Nantes, 1897–8, xvi, 66.—**Gerard** (E.) Examen chimique de la salive dans un cas de sialorrhée chez un épileptique. Compt. rend. Soc. de biol., Par., 1897, 10. s., iv, 1017–1019.—**Good** (P.) Deux cas de papillomes du voile du palais. Arch. internat. de laryngol. [etc.], Par., 1897, x, 681–688.—**Goris**. Note complémentaire concernant l'opération de la sinusite maxillaire chronique. Rev. internat. de rhinol., otol. et laryngol., Par., 1897, vii, 490. ——— Notes sur l'uranostaphylorraphie. Presse méd. belge, Brux., 1898, l, 9.—**Grube** (W.) Zur Lehre von der Chloroform-Narkose. Arch. f. klin. Chir., Berl., 1898, lvi, 178–188.—**Hahl** (G.) Die Prothesen nach Kieferresectionen. Arb. a. d. chir. Klin. d. k. Univ. Berl., 1897, xii, 1–41.—**Hamlet** (F. P.) The treatment of teeth having putrescent pulps. Items Interest, N. Y., 1898, xx, 33–35.—**Harlan** (A. W.) The drug habit. Dental Rev., Chicago, 1898, xii, 3–7.—**Harned** (M. R.) The law of similars applied to dentistry. *Ibid.:* 18–22.—**Hartman** (J. H.) A case of angioma of the tonsil, with recurrence of the same three years after removal. N. York M. J., 1897, lxvi, 871.—**Haskell** (L. P.) Our porcelain teeth. Dental Rev., Chicago, 1898, xii, 7–10.—**Heckard** (W. A.) Device for heating water. Dental Digest, Chicago, 1897, iii, 763.—**Heide**. Prothèse buccale. Gaz. d. hôp., Par., 1897, lxx, 1424.—**Heidé**. Etude critique sur le travail à pont. Odontologie, Par., 1897, 2. s. iv, 409–425.—**Heitmüller**. Die Verwendung des elastischen Gummibandes bei Kieferbrüchen, besonders in veralteten Fâllen. Deutsche Monatschr. f. Zahnh., Leipz., 1897, xv, 523–529.—**Hesse** (F.) Zur Mechanik der Kaubewegung des menschlichen Kiefers. *Ibid:* 517–523.—**von Hippel** (R.) Ueber Bau und Wesen der Ranula. Arb. a. d. chir. Klin. d. k. Univ. Berl., 1897, xii, 100–129, 1 pl.—**Hirsch** (W.) The question of sensory fibres in the hypoglossal nerve. N. York M. J., 1898, lxvii, 58.—**Holbrook** (A.) Cataphoresis. Dental Digest, Chicago, 1897, iii, 766–776.—**Honigmann** (F.) Zur Lokalanästhesie. Centralbl. f. Chir., Leipz., 1897, xxiv, 1305–1308.—**Howe** (H. W.) Crowns and bridges. Dental Pract., Buffalo, 1898, xxix, 1–3.—**Hunt** (A. O.) The adaptation and retention of artificial dentures. Dental Rev., Chicago, 1898, xii, 1–3.—**Jennings** (C. E.) Cancer of the tongue. Tr. M. Soc. Lond., 1896–7, xx, 37–43.—**Jessop** (T. R.) Imprisoned tooth; an obscure cause of cervical abscess. Lancet, Lond., 1898, i, 150.—**Jones** (J. H.) Vulcanite and vulcanizing. Dental Rec., Lond., 1898, xviii, 1–7.—**Kattwinkel** (W.) Ueber Störungen des Würgreflexes, der Sprache und der Deglutition bei Hemiplegien. Deutsches Arch. f. klin. Med., Leipz., 1897, lix, 317–346.—**Keefe** (D. E.) Chloroform and ether; a criticism of Dr. Leonard Hill's address, with some remarks on syncope under anesthetics. Bost. M. & S. J., 1897, cxxxvii, 641–643.—**Klapp** (R.) Zur Kasuistik der Dermoide des Mundbodens. Beitr. z. klin. Chir., Tubing., 1897, xix, 609–622.—**Kraus** (E.) Eine neue Theorie und eine neue Behandlungsmethode der Fistelstimme. Allg. Wien. med. Ztg., 1897, xlii, 579.—**Krebs** (G.) Was ist Pharyngitis sicca? Wien. klin. Rundschau, 1897, xi, 785.—**Kronfeld** (R.) Knochen-Metastase nach eitriger Periostitis. Oesterr.-ungar. Vrtljschr. f. Zahnh., Wien, 1897, xiii, 455–457.—**Kuhn** (C. G.) The preliminary education of the dental student. Dental Reg., Cincin., 1898, lii, 11–14.—**Lacour** (R.) La pharyngotomie sous-hyoïdienne (technique operatoire, indications cliniques). Gaz. hebd. de méd., Par., 1897, n. s., ii, 1181–1183.—**Laurence** (H. E.) Necrosis. Brit. J. Dent. Sc., 1897, xl, 1015–1023.—**Leche** (W.) Ueber Schlosser's Bemerkungen zu meiner Entwickelungsgeschichte des Zahnsystems der Säugetiere. Anat. Anz., Jena., 1897, xiv, 223–225.—**Lermoyez** (M.) **et Barozzi**. A propos d'un cas de zona double buccopharyngien le demembrement de l'herpès du pharynx. Odontologie, Par., 1897, 2. s., iv, 379–391.—**Lexer** (E.) Die Schleimhaut des Rachen als Eingangspforte pyogener Infectionen. Arb. a. d. chir. Klin. d. k. Univ. Berl., 1897, xii, 42–61, 1 pl.—**Leyser**. Nochmals die Frage der Narkose bei der Operation der Hyperplasie der Rachentonsille mit besonderer Berüchsichtigung der Behauptung: Nur in narkose kann gründlich operirt werden. Therap. Monatsch., Berl., 1897, xi, 655–658.—**Lotheissen** (G.) Ueber Geschwülste der Glandula submaxillaris. Beitr. z. klin. Chir., Tubing., 1897, xix, 481–492, 1 pl.—**Ludwig** (A.) Ueber Narkose mit Aethylchlorid. *Ibid.:* 639–664.—**Mason** (W. D. M.) Alveolar abscess, with fistulous opening in the neck. Texas Dent. J., Dallas, 1898, xvi, 3.—**Mayr** (J.) Seltene Körperverletzung. Friedreich's Bl. f. gerichtl. Med., Nurnb., 1897, xlviii, 457.—**Melchior-Robert** (P.) Observation nouvelle de langue noire pileuse; contribution à l'étude de cette affection, au point de vue spécial de son origine parasitaire et de la spécificité du champignon décrit par Ciaglinski et Hewelke et par Sendziak (de varsovie) sous le nom de Mucor niger. Marseille méd., 1897, xxxiv, 753–768, 1 pl.—**Meltzer** (S. J.) The question of sensory fibres in the hypoglossal nerve. N. York M. J., 1898, lxvii, 125.—**Merritt** (C.) Some personal recollections. Dental Pract., Buffalo, 1898, xxix, 8–17.—**Michaels**. Description du musée préterre. Odontologie, Par., 1897, 2. s., iv, 374–379.—**Miller** (L. H.) Angioma of the base of the tongue. Brooklyn M. J., 1898, xii, 41.—**Mitchell** (H. B.) Considerations relating to the loosening of the teeth. Ohio Dent. J., Toledo, 1898, xviii, 18–25.—**Monti** (A.) Die Krankheiten des Mundes. Wien Klinik, 1897, xxiii, 1. Supplhft., 1–40.—**Morel-Lavallée.** Troubles trophiques unilatéraux de la face et de la bouche. Ann de dermat. et syph., Par., 1897, 3. s., viii, 1261–1263.—**Müller** (E.) Goldkronen, Kapselstiftzähne und abnehmbare Brückenarbeiten. Oesterr.-ungar. Vrtljschr. f. Zahnh., Wien, 1897, xiii, 457–473.—**Nux** (L.) Traitement des dents à pulpe morte. Odontologie, Par., 1897, 2. s., iv, 425–443. ——— *Also:* Rev. odont. Par., 1897, xvi, 533–560.—**Osborne** (H. F.) Trituberculy; a review dedicated to the late Professor Cope. Am. Naturalist, Phila., 1897, xxxi, 993–1026, 1 tab.—**Osler** (W.) On chronic symmetrical enlargement of the salivary and lachrymal glands. Am. J. M. Sc., Phila., 1898, cxv, 27–30.—**Paget** (S.) Cancrum oris. Clin. J., Lond., 1897–8, xi, 149.—**Palmer** (E.) State dental laws; effective and defective. Pacific Stomatol. Gaz., San Fran., 1897, v, 533–542.—**Paul** (J. W.) Care and treatment of children's teeth. Dental Rev., Chicago, 1898, xii, 17.—**Phocas.** L'ablation des amygdales. Nord méd., Lille, 1898, iv, 7–9.—**Placzek.** Ein Fall von Masseterkrampf. Berl. klin. Wchnsch., 1897, xxxiv, 1080.—**Pottiez** (C.) Contribution à l'étude des calculs salivaires. Bull. Acad. roy. de méd. de Belg., Brux., 1897, 4. s., xi, 838–843.—**Power** (D'A.) Empyema of the antrum in a child aged eight weeks. Laryngoscope, St. Louis, 1898, iv, 24.—**Read** (W. R.) Dental caries, Brit. J. Dent. Sc., Lond., 1898, xli, 1105–1111.—**Reinke** (F.) Ueber die funktionelle Struktur der menschlichen Stimmlippe mit besonderer Berücksichtigung des elastischen Gewebes. Anat. Hefte, Wiesb., 1897, ix, 105–116, 1 pl.—**Rhodes** (W. A.) Notes on a case of replantation. J. Brit. Dent. Ass., Lond., 1897, xviii, 761.—**Richardson** (C. W.) Diseases of the antrum. Virginia M. Semi-Month., Richmond, 1897–8, ii, 553–556.—**Ried** (A.) Zur Infiltrationsanästhesie. Beitr. z. klin. Chir., Tubing., 1897, xix, 665–684.—**Rochet et Martel.** Trois cas d'actinomycose cervico-faciale; une forme nouvelle hyperostosante; une forme très atténuée; une forme commune. Gaz. méd. de Par., 1898, 11 s., i, 1–6.—**Roe** (J. O.) A case of unusual defective development in an infant; consisting of compound complicated double harelip, and bilateral maxillary fissure, with attachment of the intermaxillary bone to the end of the nose; correction of this deformity by plastic operation. Buffalo M. J., 1897–8, xxxvii, 401–409.—**Romme** (R.) La méthode d'anesthésie chirurgicale de Schleich. Presse méd., Par., 1897, ii, 399.—**Rose** (H.) Dental mechanics; appliances and devices for the correction of dental irregularities. Brit. J. Dent. Sc., Lond., 1898, xli, 1–7.—**Rudas** (G.) Adalékok a fogbél szövettanához. [Histology of the appendixes of the interior of the tooth.] Magyar fogász szemle. A stomatol. [etc.], Budapest, 1897–8, ii, i; 33.—**Scheff** (J.) Mitnahme der Ersatzbachenzahnkrone bei der Extraction des zweiten unteren Milchmolar. Oesterr.-ungar. Vrtljschr. f. Zahnh., Wien, 1897, xiii, 452–455.—**Schwartz** (W.) Angeborene Spalten in den Gaumenbogen. Ztschr. f. Ohrenh., Wiesb., 1897, xxxii, 67–69. ——— Behaarter Rachenpolyp. *Ibid:* 66.—**Siddall** (W. A.) A unique method of backing a tooth. Ohio Dent. J., Toledo, 1898, xviii, 7.—**Smreker** (E.) Cementfüllung mit Zinngoldrand. J. f. Zahnheilk., Berl., 1897, xii, No. 45. ——— *Also:* Oesterr.-ungar. Vrtljschr. f. Zahnh., Wien, 1897, xiii, 445–452.—**Staderini** (R.) Le fibræ propriæ e le arciformes internæ nell 'atrofia sperimentale del nucleo di origine dell 'ipoglosso. Monitore zool. ital., Firenze, 1897, viii, 194–200.—**Strong** (T. M.) A case of harelip and cleft-palate with repair of former; a case of cicatricial adhesion of palate. Homœop. Eye, Ear and Throat J., 1898, iv, 41–45.—**Sweeny** (G. B.) The faucial tonsil as an agent of systematic infection. Penn. M. J., Pittsburg, 1897, i, 269–273.—**Talbot** (E. S.) Oral hygiene Dental Digest, Chicago, 1897, iii, 777–781. ——— A study of the deformities of the jaws among the degenerate classes of Europe. Internat. Dent. J., Phila., 1898, xiv, 1–9.—**Tellier** (J.) Rapports de l'odontologie avec les autres branches des sciences médicales. Province méd., Lyon, 1897, xi, 565; 577.—**Tomaselli Peratoner** (V.) Corpo estraneo nella cavità orale. Riforma med., Napoli, 1897, xiii, pt. 4, 292.—**Triolo** (G.) Azione della saliva sui batteri; contributo allo studio dei mezzi naturali di difesa dell' organismo contre le infezioni. Ufficiale san., Napoli, 1897, x, 529–549.—**Vires** (J.) Diathèse lymphogène [lymphadénose]. Gaz. med. de Par., 1897, 10. s., i, 601–607.—**Warren** (G. W.) The therapeutic treatment of infected tooth-root canals. Internat. Dent. J., Phila., 1898, xix, 11–15.—**Webb** (M. A.) Shaping and improving the appearance of the natural teeth with the wheel used in the dental engine. Dental Rev., Chicago, 1898, xii, 29–33.—**Wedelstaedt** (E. K.) Some new experiments with amalgam; large amalgam vs. small amalgam pluggers. Items Interest, N. Y., 1898, xx, 28–31. [Discussion], 36–40.—**Weiss** (J.) Ein neues Phantom für den Unterricht an Zahnärztlichen Lehranstalten. Oesterr.-ungar. Vrtljschr. f. Zahnh., Wien, 1897, xiii, 473–476.—**Whitney** (J. M.) The value of gold as a material for filling teeth. Pacific Stomatol. Gaz., San Fran., 1897, v, 543–556.—**Wolff** (J.) Ueber die operation der doppelten Hasenscharte mit rüsselartig prominirendem Zwischenkiefer und Wolfsrachen. Berl. klin. Wchnschr., 1897, xxxiv, 1021; 1054; 1073.—**Wright** (F. R.) Syphilis. Dental Rev., Chicago, 1898, xii, 10–16.—**Young** (J. L.) Bridgework. Dental Reg., Cincin., 1898, lii, 1–11.

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# DENTAL COSMOS.

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## ORIGINAL COMMUNICATIONS.

### HUMAN TEETH FROM A COMPARATIVE STANDPOINT.

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(Read before the American Dental Association, August 4, 1897.)

(Concluded from page 113.)

BEFORE pointing out the zoological position of the human molar teeth as compared with the various types of molars found among the mammalia, an examination of these principal forms, as defined by Cope,* may serve to bring the subject more clearly before us.

Four well-defined types of molars are found in mammalian dentures, as follows:

I. *Haplodont type.*—The crown undivided or simple. Existing toothed whales, some carnivora, edentates, and certain rodents, have teeth of this description.

II. *Ptychodont type.*—The crown folded on the sides, the folds frequently crossing the crown. Most rodents bear molars of this type.

III. *Bunodont type.*—Crown supporting tubercles. The molars of a few existing and many extinct ungulates, carnivores in general, and most primates, including man, are of this type.

IV. *Lophodont type.*—The summit of the crown thrown into folds of transverse or longitudinal direction. The Lophodonts comprise the higher ungulates and some rodents.

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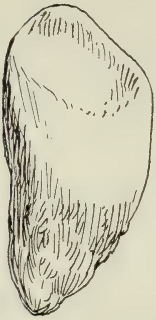
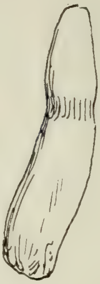
*"On the Homologies and Origin of the Types of Molar Teeth of the Mammalia Educabilia," *Journal of the Academy of Natural Sciences*, Philadelphia, 1874.

FIG. 14.



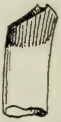
Walrus.

FIG. 15.



Dolphin.

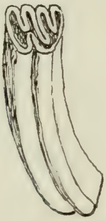
FIG. 16.



Sloth.
(Actual size.)

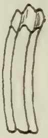
MOLARS OF HAPLODONT TYPE.

FIG. 17.



Beaver.

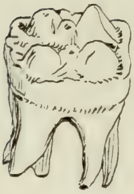
FIG. 18.



Rabbit. (Actual size )

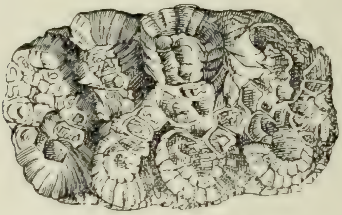
MOLARS OF PTYCHODONT TYPE.

FIG. 19.



Peccary. (Actual size.)

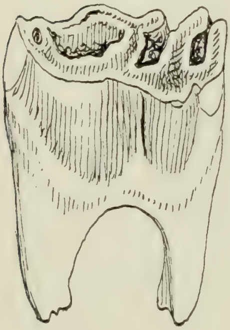
FIG. 20.



Mastodon. (× ⅓.)

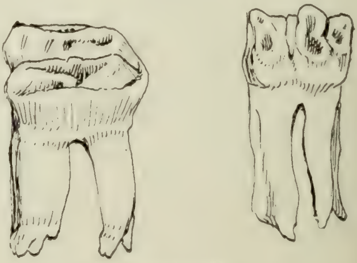
MOLARS OF BUNODONT TYPE.

FIG. 21.



Elk.

FIG. 22.



Manatee.

MOLARS OF LOPHODONT TYPE.

The derivation of the bunodont from the haplodont type, by a development of accessory tubercles on the crown of the primitive tooth, and the gradual evolution of the lophodont type from the bunodont, are inferences toward which a study of the paleontological evidence inevitably leads. The highest stages of development to which the molar teeth have attained are found among the terrestrial carnivora on the one hand and the higher ungulates on the other, both of which orders (together with the remainder of the Educabilia) are probably derived, as believed by Cope, from a bunodont ancestor, having plantigrade pentadactyle feet. In fact, the primitive bunodont type of molar characterized the mammals of the early Eocene period. But we ourselves are plantigrade, pentadactyle bunodonts.

So that, here again, man's vaunted superiority of structure disappears on close inspection. To quote Cope, "In his (man's) teeth his character is thoroughly primitive. He possesses, in fact, the original quadrituberculate molar with but little modification. His structural superiority consists solely in the complexity and size of his brain." Two main factors have contributed to retard the dental specialization of the primates: First, their arboreal habits, which necessitated a diet neither carnivorous nor herbivorous, but frugivorous, and more easily comminuted than either of the former. Second, the presence of highly specialized prehensile fore-limbs, which largely relieved the mouth of its manipulative functions. Add to this, in man's case, the invention of the knife and of cookery, whereby the food is not only reduced to mouthfuls but softened as well, and the causes of our dental inferiority stand confessed; for the moment a tool intervenes to aid or accelerate the functions of a bodily organ, that moment all onward evolution of that organ ceases. Imagine a beaver armed with an axe in addition to his rodent incisors.

That a retrograde evolution or degeneration of these organs is at work in man is apparent to the student of physical anthropology. To him each upward stride of civilization, of ethnic superiority, is associated with indubitable evidences of structural inferiority; so that the evolutionist's prophetic vision of the "coming man" as a bespectacled, bald-headed, and edentulous individual of infantile proportions but preternatural intelligence, appeals to him as a not impossible result of modern life.

## THE TEETH AS A FACTOR IN ANTHROPOLOGY.

In the study of the human race, not alone the teeth, but the jaws, the palate, and the attachments of the muscles concerned in mastication, are points of vital importance in the differentiation of types. To the dentist, no less than to the professional anthropologist, the methods and results of craniometry are therefore of interest, yet, owing to the scarcity of literature of the subject and the special nature of the instruments employed, the study of the teeth as a factor in anthropology is almost entirely neglected by the dental profession.

The important studies of Dr. Patrick on the teeth of aborigines prove, however, that for certain lines of investigation the dentist is already singularly well equipped.

Of variations due to the development of the muscles of mastication, for example, we have, first, the *comparison of the areas of origin of the temporal muscle.*

The temporal ridges, wanting in the child, are but faintly marked, as a rule, in adult white women; heavier in white men, yet in both circumscribing a rather restricted area. In savage races the areas of origin of the temporal muscles are larger, particularly in males, and the temporal ridges consequently creep higher and higher and lie nearer to the sagittal suture. Thus, in a well-developed representative adult male European, the shortest distance between temporal ridge and sagittal suture is 65 millimeters; while the same measurement on a Papuan man from New Ireland is but 46 millimeters. Obviously the latter had the stronger temporals. Turning to the anthropoids, we find that the female orang, and the young males as well, have temporal ridges more marked than in man, but still separated by a considerable interval from the sagittal suture. As the young male develops, however, these ridges creep upward, until they finally meet and form the immense sagittal crest characteristic of the male anthropoid.

It was by the study of these shifting temporal ridges, in a series of more than thirty skulls, that Mr. Frederic A. Lucas was enabled to prove that two supposedly distinct species of orangs were but young and adult of the one species, *Simia satyrus.*

The areas of origin and insertion of the masseter muscle are indicated by the degree of development of the zygomatic arch and of the ascending ramus of the jaw. Not only are these points of anchorage reduced in size in the female of all human tribes, but it is in the savage that they attain their greatest development, here again approaching the simian condition. The width of the ascending ramus of the lower jaw, taken at the height of the border of the alveoli of the molar teeth, is a convenient index of the development of the masseter muscles. The greater size of the digastric fossæ in the jaws of savages indicates a correspondingly greater development of the digastric muscles.

THE ASCENDENCY OF INDIVIDUAL MUSCLES OF MASTICATION is indicated not only by the asymmetry of the condyles, where the lateral movement has been habitually made in one direction (one condyle serving as a pivot while the other united in the excursive movements of the mandible), but it is also manifested by the outwardly or inwardly everted angle, the former indicating ascendency of the masseter muscles, the latter of the internal pterygoids. The relation of the angle of the jaw to muscular action is well illustrated by the comparison of the jaws of infant, adult, and aged persons. Only during the functional activity of the teeth is the angle approximately a right angle, while in the fetus, during childhood, and in old age the angle of the horizontal with the perpendicular ramus is more open. A similar tendency is believed to result from mouth-breathing. The disappearance of the angle of the jaw here hinted at, and which actually occurs in certain edentulous forms, as the ant-eater and the baleen whales, is due to the absorption of a muscular anchorage when no longer used. So intimately are ancient ancestral traits incorporated in our psychological make-up that we instinctively recognize a large outwardly everted angle and heavy ramus as correlated with firmness and decision, although many generations must have elapsed since these virtues were actually assisted by the jaws. That the human teeth were once used as weapons is unconsciously revealed, as pointed out by Darwin, in the retraction of the upper lip in anger, which is but a muscular memory of the uncovering of the canines, which, in all canine-bearing mammals, is a preparation for combat.

Another point in which the jaws of aboriginal tribes are, as a rule, superior to those of civilized races is in the proportions of the horizontal ramus. As pointed out by Harrison Allen, the alveolar and inferior borders of the jaw tend to parallelism in savages, while in civilized races the symphysial height is usually greater than the height in the vicinity of the molars. This may be due to gradual degeneration of the platysma myoides muscle. Of the significance of the "antegonium" or "pregonium" of the same author I am uncertain, but incline to the belief that it is a "stigma of degeneration." Finally, an as yet incompleted study of the relative proportion of jaw to skull has convinced me that the jaws of savages are not only proportionately but actually heavier than our own, and that the "cranio-mandibular index," as I term it, which is the ratio between the weight of jaw and weight of cranium, rises steadily as we descend from semi-civilized to barbarous and savage tribes.

Thus, while the white males examined gave an index (proportion of jaw to skull) of 11.8, the male Australians presented an index of 15.4.*

The facial angle, invented by Camper and subsequently modified by so many craniologists, gives in a general way *the proportion between the brain-cavity and the jaws.* Beginning with the ideal Greek type (found to-day only in statues and hydrocephalics), with an angle of ninety degrees, a gradual lessening of the angle occurs as we descend in the scale of humanity. The fact that the exterior of the skull may be widely separated from the inner table, and particularly at the forehead, to which one arm of this angle is tangent, has gradually tended to invalidate the testimony of this once unquestioned criterion. A more accurate method of arriving at this proportion is by

## THE DEGREE OF PROTRUSION OF THE UPPER JAW,

or, as it is technically termed, the degree of *superior prognathism.* This is readily estimated by means of the gnathic index of Professor Wm. H. Flower. In this method the basi-nasal length (see Fig. 23) is compared with the basi-alveolar length, as follows:

$$B\,N : B\,A :: 100 : x, \text{ or } \frac{B\,A \times 100}{B\,N} = \text{gnathic index.}$$

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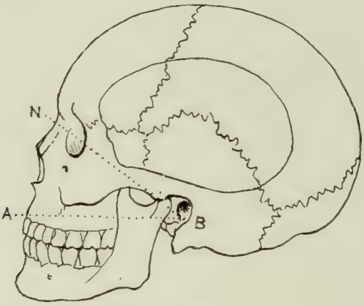
*For further particulars, see paper entitled "A Cranio-Mandibular Index," read before the Association of American Anatomists at their meeting of December, 1897.

In the classification employed by Professor Flower the arbitrary limits of the three degrees of prognathism recognized are as follows: Orthognathous, under 98; mesognathous, from 98 to 103; prognathous, above 103.

According to Topinard, the races of Europe have the least amount of protrusion, the yellow races and Polynesians much more, and the Negro races still more.

After a careful comparison of the amount of variation for each index taken of the various series of skulls collected by the Challenger expedition, Sir William Turner states that "the gnathic index showed a much greater amount of variation in the several groups than the cephalic or vertical; in only five was the range below 10, while in the remaining seven it rose above that figure, and in the Admiralty Islanders was as high as 18." And again, "The gnathic index ranks also very high as a racial feature, whilst the other indices to which I have referred (nasal, orbital, facial, etc.) are only of secondary importance." Yet it may be accepted, as a rule, that extreme prognathism is found only among very low races of men.

FIG. 23.

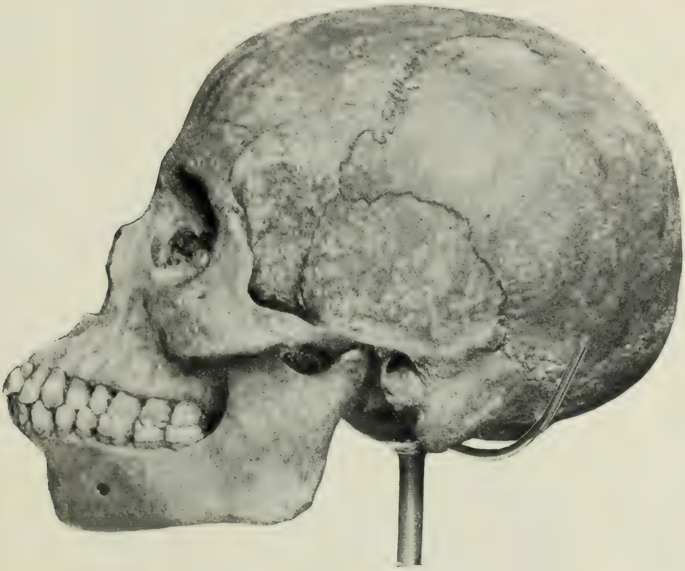


N.—*Nasion*, the middle of the naso-frontal suture.
A.—*Alveolar Point*, the center of the anterior margin of the upper alveolar arch.
B.—*Basion*, the middle of the anterior margin of the foramen magnum.
BN.—Basi-nasal length, or shortest distance from basion to nasion. (Measured with calipers or craniometer.)
BA.—Baso-alveolar length, or distance from basion to alveolar point.

That prognathism is an acquired character, due to the late period at which the child is weaned among primitive people, as suggested many years ago by Lawrence, and later by Owen, is a more ingenious than satisfactory explanation of this phenomenon. It has, indeed, been denied that prognathism could be detected in the young children of those races whose adults are so characterized. Yet the skull of the Negro baby at birth, included in the collection, has an index of 98.1, or considerably higher than that of the white child at birth. Evidently, here, prognathism is an inherited feature.

The profile of the skull of a Negro of the Fan tribe, of West Africa, well illustrates this condition, so ape-like in appearance. In direct relation with the protrusion of the jaws is the position of the third molar. In whites the distal border of the inferior third molar ( $m^3$ ) extends beyond the anterior border of the ascending ramus, so that in a lateral view of the jaw it is partially or totally hidden. In savages, on the contrary, the distal border of the third molar is in front of the border of the ascending ramus, as in anthropoids generally. Confluence of the roots of the superior third molar, likewise an indication of degeneracy, is probably a sequence of its disadvantageous location and occasional total lack of occlusion with its inferior antagonist, in the civilized races. In savages, as in anthropoids, its three roots are free and diverging. Both $m^3$s of the Fan skull figured have as well-formed roots as the ordinary Caucasion $m^1$.

FIG. 24.



Skull of Negro, Fan Tribe, West Africa.

### FOUR FORMS OF THE SUPERIOR ALVEOLAR ARCH

were recognized by Professor Broca as constituting ethnic characteristics.

I. *The Hyperbolic.*—In which the branches of the arch diverge posteriorly.

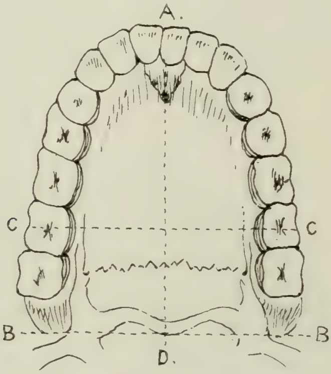
II. *Parabolic.*—"Where they still diverge, but in such a manner that if prolonged they would eventually return upon themselves and meet."

III. *U-shaped.*—When the sides of the arch are exactly parallel.

IV. *Elliptical.*—When they converge, whatever the degree of such convergence may be. Of them Topinard says, "The first two and noblest forms are common in the white races; the third and fourth are rare, and are especially seen in black races; the form of the letter U is that of anthropoid apes; the elliptical is seen in the sagon and the macaque.

*The form of the palate* is recorded by the *palato-maxillary index* of Professor Flower, which differs considerably from the palatal index of Broca. In the former the width of the alveolar arch is compared with its length. The accompanying diagram is self-explanatory.

FIG. 25.



A.—Alveolar point, or middle of superior alveolar arch.
B B.—A line drawn across the posterior borders of the maxillary bones.
A D.—Length of palate.
C C.—Width of palate, taken between outer borders of alveolar arch immediately above the middle of the second molars.

In the proportion A D : C C : : 100 : x, x is the desired index. Three varieties are recognized, with the following limits: *Dolichuranic*, index below 110; *mesuranic*, between 110 and 115; *brachyuranic*, above 115. The form of the palate is correlated with that of the skull; thus a brachycephalic skull will present a brachyuranic palate, a long skull a long palate, etc.

Of the crania of races collected by the Challenger expedition, those of the Australians possessed the largest palato-alveolar arches. In his general summary of the "Report on Human Crania,"* Sir Wm. Turner says, "A long palato-alveolar arch is to be regarded as a sign of degeneration of the human cranium, and this is the more marked when it is associated with relative narrowness and the consequent production of a low palato-maxillary index." He also calls attention to the fact that the length of this region in adult anthropoid apes is "invariably considerably greater than the breadth, so that the palato-maxillary index is very low."

## THE WEAR OF THE TEETH.

The naturalists' dictum that "the age of an animal is determined by the duration of its teeth" has ceased to apply to man, although surviving in the old saying that "every tooth lost from your head is another nail in your coffin," or words to that effect. It is unusual among civilized men to find a denture in which the cusps of the molars are worn entirely smooth, while certain extreme conditions of wear seem to be restricted to aborigines.

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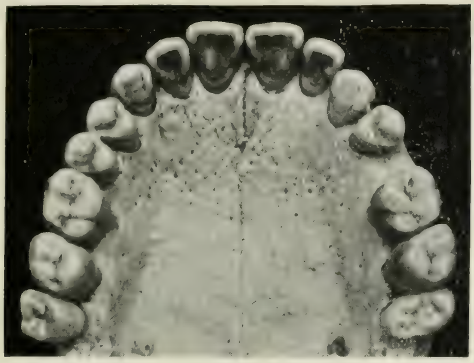
*The Voyage of H. M. S. Challenger. Zoology.

Broca, who contributed so much toward lifting physical anthropology to the plane of an exact science, has left us a method, at once rapid and accurate, whereby the degree of wear of the teeth in a given denture may be recorded. He recognized four degrees of wear:

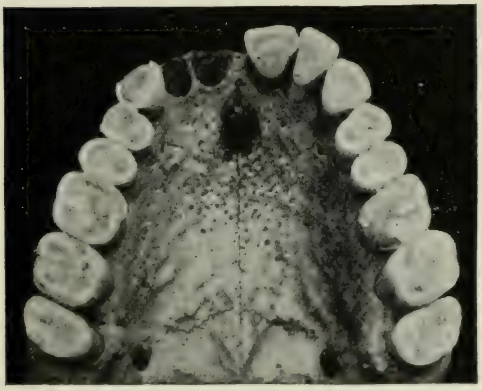
In the *first* the enamel alone is worn, without any obliteration of the cusps (Fig. 26).

FIG. 26.



European.
FIRST DEGREE OF WEAR.

FIG. 27.



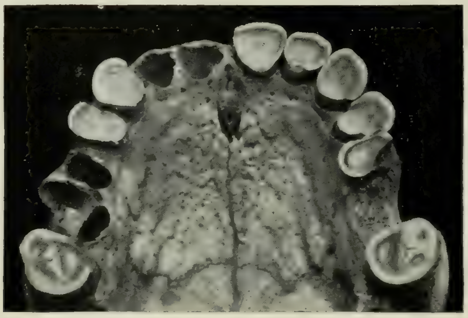
Moriori, Chatham Id., N. Z.
SECOND DEGREE OF WEAR.

In the *second* degree the tubercles of the crown have disappeared, and the dentin is exposed (Fig. 27).

In the *third* degree of wear the height of the tooth is still further reduced (Fig. 28), while in the *fourth* the wear has extended to the neck, the crown having entirely disappeared, while either the pulp-cavities are invaded or barriers of secondary dentin have formed (Fig. 29).

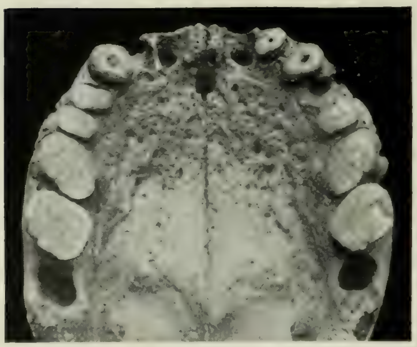
That the degree of wear is an index of age is true only of civilized races, where the teeth are used exclusively for mastication. Among aboriginal and semi-civilized tribes the wear may indicate diet or particular habits. Thus the skulls of the mound-builders of Florida exhibit teeth the extreme wear of which is attributed to the sand with which their food must have been unavoidably adulterated. The combined action of the silica of the corn and of the pulverized particles of the *metate* or primitive stone mill within which it was ground account satisfactorily for the condition of wear observed in young adult Pueblos and other sedentary Indians, while the chewing of the betel nut among the Malays and Polynesians contributes to the same end.

FIG. 28.



American Indian.
THIRD DEGREE OF WEAR.

FIG. 29.



Aborigine, San Maguil Id., Coast of California.
FOURTH DEGREE OF WEAR.

Nowhere, perhaps, are the teeth subjected to greater wear than among the Hyperborean races, the Esquimaux, Laps, Fins, etc.

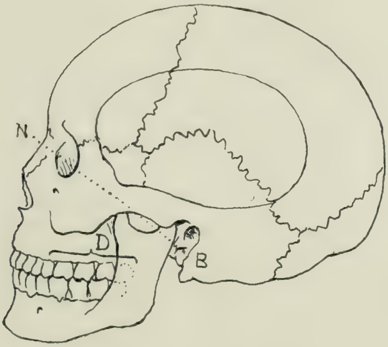
Here the manipulation of skins for robes and clothing is performed principally by the jaws, and it is reported that the skins of the eider duck are thus prepared by chewing by the children in the schools of Iceland.

## THE DENTAL INDEX.

It remained for Professor Wm. H. Flower, the celebrated English anatomist, to discover a natural racial grouping of mankind by their teeth. He takes the length in a straight line of the five teeth of the upper molar series *in situ* ($p_{1 \text{ and } 2}$ and $m_{1, 2, \text{ and } 3}$), measuring from the mesial border of the first premolar to the distal border of the third molar, as the *dental length* (D).

This is compared with the cranio-facial axis or basi-nasal length (B N); the latter estimated as 100. This axis is measured from the *nasion* (naso-frontal suture) to the basion (the middle of the anterior border of the foramen magnum). Then in the proportion D : B N : : x : 100, x is the dental index, or $\frac{D \times 100}{B\ N}$ = dental index.

FIG. 30.



The basi-nasal length can obviously be measured directly only upon the denuded skull, but it may be estimated on the living subject by projecting the nasion and the auricular point (center of the external auditory meatus) upon a plane surface and there measuring the distance between these points. The dental indices are grouped under three series, as follows: *Microdont,* below 42; *mesodont,* between 42 and 44; *megadont,* above 44.

We have seen that the dental index thus arrived at is the proportion between the length of the superior molar series and the basi-nasal length. To bring a given race within the megadont series, for example, one of two conditions must be present: either the dental length must be great or the basi-nasal length small. In the latter event the term *megadont* would be merely relative; in the former positive. Theoretically it would seem that the cranio-facial axis, embracing as it must the cerebral fossa, would be at its maximum in civilized races. An inspection of the following chart* proves that this is not the case.

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*Reproduced from a chart published by the U. S. National Museum.

PROFESSOR W. H. FLOWER'S CLASSIFICATION OF THE HUMAN RACE.

| | Sex. | Number of Observations. | Average Basio-Nasal Length. | Average Dental Length. | Average Index. | Average Index of Both Sexes. |
|---|---|---|---|---|---|---|
| MICRODONT RACES. | | | | | | |
| British | M. | 20. | 100.0 | 41.0 | 41.0 | 41.3 |
| | F. | 13. | 95. | 39.5 | 41.6 | |
| Mixed Europeans (not British) | M. | 52. | 101.3 | 41.0 | 40.5 | 41.1 |
| | F. | 14. | 95.1 | 39.6 | 41.6 | |
| Ancient Egyptians | M. | 7. | 101.4 | 41.4 | 40.8 | 41.0 |
| | F. | 8. | 95.9 | 39.5 | 41.2 | |
| Polynesians (mostly Sandwich Islanders) | M. | 22. | 105.3 | 42.2 | 40.1 | |
| Low Caste Natives of Central and Southern India (mostly M) | ...... | 42. | 99.5 | 41.2 | 41.4 | |
| MESODONT RACES. | | | | | | |
| Chinese | M. | 12. | 98.8 | 42.1 | 42.6 | |
| American Indians of all parts | M. | 31. | 99.2 | 42.5 | 42.8 | |
| Malays of Java, Sumatra, etc | M. | 70. | 99.7 | 43.2 | 43.3 | |
| African Negroes of all parts | M. | 44. | 103.0 | 44.5 | 43.2 | 43.9 |
| | F. | 26. | 97.9 | 43.6 | 44.6 | |
| MEGADONT RACES. | | | | | | |
| Melanesians (of various islands) | M. | 21. | 102.3 | 45.2 | 44.2 | |
| Andamanese | M. | 9. | 94.4 | 41.9 | 44.4 | 45.5 |
| | F. | 8. | 88.8 | 41.2 | 46.5 | |
| Australians | M. | 22. | 102.5 | 45.9 | 44.8 | 45.5 |
| | F. | 14. | 95.5 | 44.0 | 46.1 | |
| Tasmanians | M. | 9. | 100.0 | 47.5 | 47.5 | 48.1 |
| | F. | 4. | 95.5 | 46.5 | 48.7 | |

Among the microdont races the Polynesians show a much longer basi-nasal diameter than either Europeans or ancient Egyptians. This diameter is indeed surprisingly similar among the British, the mixed Europeans, and the Egyptians, ranging from 100 to 101.4 millimeters for the males and from 95 to 95.9 millimeters for the females. It is a curious fact that the British microdonts of either sex have almost precisely the same basi-nasal length as the megadont Tasmanians,—namely, 100 millimeters for the men and 95 to 95.5 millimeters for the women. But the dental length is observed to be shorter in the microdont series than in either the mesodont or megadont series, with two notable exceptions. The Polynesians give an absolutely longer dental length than that of the mesodont Chinese, for the reason that the skulls are larger in all their dimensions in the former race. On the other hand, the Andaman Islanders, although megadonts, have a dental length but little in advance of the European, and considerably under the Polynesians. This is owing to the circumstance that their skulls are exceedingly small,—microcephalic in fact,—a feature in keeping with their stunted stature. But, with these exceptions, there is an absolute as well as a proportional increase in the size of the molars, corresponding with the rise in the dental index.

That the lowest known races of mankind should have the largest teeth, the heaviest jaws, the greatest prognathism, and forms of palate and of dental arcade similar to those of the anthropoid apes, are facts whose significance, from an evolutionary standpoint, cannot be ignored.

And as the heraldic devices of a coat of arms convey to the practiced eye information concerning forgotten ancestors and their valiant deeds, so too, I believe, is man's genealogy blazoned on his molars, where he who will may read.

NOTE.—My attention having been called by Dr. Kirk to an error in my statement regarding the absence of enamel in the tusks of the walrus (p. 104, DENTAL COSMOS for March), I desire to correct it. The tusks of the walrus, like those of the elephant, are originally tipped with enamel, which is soon worn away, leaving no trace in the adult tusk.

# DENTISTRY OR STOMATOLOGY.

BY THOMAS C. STELLWAGEN, M.D., D.D.S., PHILADELPHIA, PA.

(Read before the New York Odontological Society, November 16, 1897.)

IT must not be supposed that because your essayist is perfectly convinced of the truth of the subject of this evening's essay your society's decision would not be severely painful if it should see fit, after calm consideration, to pass unfavorably upon the project. It cannot be concealed or forgotten that there is much opposition to the comparatively new word. There always is a conservative spirit which arraigns against innovations. Upon the other hand, it is not unfair to claim that this change of name is urged by some who would most earnestly and sincerely give much of their ease and personal comfort to contribute to the advancement, enlargement, and utility of the profession of which this body is a representative gathering. Your calm, sober thought will pardon this attempt of one who for nearly thirty-nine years has worked in your ranks, by day and by night; one who for a lifetime has been buoyed with the hope that some more logical and able reasoner would be found who, as master of persuasive eloquence, possessed of the genius to awaken enthusiasm, could convince the practitioner of this his chosen profession that, by the inherent efforts of its votaries, it has earned a more appropriate name and deserves and should realize its power and its ability. To prove this position is to demonstrate that it has ministered unto and assuaged many of the miseries that may be spared by suffering humanity,—a demonstration happily unnecessary. The dread of the damage, delay, and possible defeat of the ultimate purpose of this paper by meddlesome or inefficient efforts, as well as a feeling of impatience with the submissiveness of the leading minds of our societies to the existing condition of their incomplete development, has long imposed a respectful silence. Years of restraint are often followed by overflow of the pent-up feeling. The time for this procrastination has passed. We must now heed the experiences which are gathering as evidences that will soon convict dentists of neglect of the opportunities to do all that can be accomplished for the healing and cure of the afflicted. Such are the considerations that have borne upon and compelled me to speak.

For some years there has been shown, more by the trend of discussions than by actual complaint, a growing dissatisfaction with the limitation of the field of work of the dentist, which is bounded on all sides by specialties of the healing art. He has been content to allow unpracticed hands to invade the mouth, and general practitioners of medicine, inexperienced in oral work, have been encouraged to dictate the modes of treatment.

It is probable that on more occasions than will ever be known the modesty, and, even worse, the timidity, of the dentist have stifled the expression of his better judgment and deterred him from rendering the fullest assistance in his power to those who by their innocent ignorance were at the mercy of, or in jeopardy from, the actions of over-confident advisers. Is it just to shut our eyes to the fact that in a more or less important degree we are culpable for this omission and delinquency? Who more fully can appreciate the necessity of the acquirement of a thorough knowledge of the diseases of the parts associated with the teeth, and the best manipulative and practical methods to be adopted for curing the same, than the dentist? Who can reasonably hope to compete in skill with those whose daily life-work has been spent in the treatment of these organs, and whose experiences are the constant struggles with the difficulties and obstacles that hedge about the path of the practiced dentist? Does it not appeal to the common sense of all that in the field of this specialty no one wishes to volunteer to compete with the practiced dentist? Are not the general practitioners driven, sometimes unwillingly, to attempt the uninviting and difficult tasks of oral surgery, because there is only the choice between that and the complete abandonment of the sufferers to painful and lingering deaths? Do we not frequently witness the misfortune and agony entailed upon those who are the sufferers from diseases of this important portion of the head, that is the gateway to the alimentary canal? Why does there yet remain such an unwillingness and hesitation to assume the additional responsibility of the study and work to prepare themselves for the most intelligent and conscientious care of the whole of the tissues or structures surrounding the teeth?

Can these organs be so dissociated from their surroundings as to be effectually treated without attention to their intimately related tissues? If, as commonly occurs as a sequel to the death and decomposition of the pulp of a tooth, there should supervene inflammation of the pericementum, dentists do not often hesitate to treat that. But here, most commonly, the line of limitation of their domain is drawn. Occasionally, in some of the simplest of fistulæ or abscesses of the alveolar processes, a few will timidly venture to assume charge of a case. How seldom, though, do the greater and more extended results of dental complication find those who practice willing to attempt the management alone, even if the patients desire them to do so? Still less, however, do the patients and their friends seem to be inspired by confidence in the dentists, by reason of their extreme limitation of this professional field. Should this be so? Should they retire from the combat with disease upon such critical occasions, and deprive their clients of their manipulative ability? It is not infrequent to hear of the judgment of very celebrated and able men in the medical profession being faulty when applied to conditions of diseases of the mouth. How common has it been for us to be consulted by patients who have lost valuable teeth that should have been saved for future use. This may in general be due to the estimated low value by the community of these beautiful and essential organs, in which both patients and friends are equally at fault. Many have been the examples of the dangers to the comfort, and even to the life, of the patients where this almost neutral territory has been the scene of the attack of some insidious carcinomatous growth. It is so frequently seen to be a source of danger to the reputation of the general surgeon, that he is loath to attempt an invasion of the neutral zone between the dentist and himself. Hesitation upon the part of both the specialist and the general practitioner may be charged with no little delay, and, even worse, with adding to the complication and gravity of the disease.

As an example of the curious views held, it may be that two cases in point will illustrate the absurdity of the understanding of the relations. The daughter of a dentist recently consulted another for the treatment and relief of a fistulous opening under the body of the inferior maxillary bone, arising originally from an alveolar abscess. She asked in all sincerity if he proposed to treat the outside of the same as well as the inside. She frankly said that she expected the dentist to consent that she should continue to have the swelling and pus-forming cavity remain under the ministration of the medico who had been in charge when it broke externally. To those of us who have had the common experience of the relief afforded by the lancing into such abscesses from the mouth, when they have almost broken through the integument of the face, and the result of this operation, thereby preventing an external and disfiguring scar, it certainly seems strange that a case of this kind could be so dilatorily treated as to permit the calamity to culminate so seriously. A dentist had been originally in charge of the case, and he was represented as having done little but apply some slight palliatives internally, and await the action of the medical man, while the latter had, by the use of poultices, encouraged the pointing of the pus upon the outside of the face. To many this simple class of cases has been a stumbling-block, and not infrequently the delays and the division of the responsibility, together with the hesitation resulting from the dread of error in judgment upon this neutral ground, have worked no little or inconsequential danger.

Some months since, three dentists were called upon to give an opinion as to the treatment of a dead tooth for a persistent and severe irritation at its root. The result was a delay of action by reason of retention of the tooth, although one dentist urged its extraction and an explorative opening of the bone as most likely to lead to the location and removal of a probable addition to the trouble, if not of the sole exciting cause. A year was allowed to elapse, and during that time sarcomatous growth had so involved the bone as to demand the removal of nearly the entire superior maxilla.

The proposition need not, however, be argued from these cases solely; every dentist or physician of experience can recall many such. These are quoted merely as typical examples of what is of far too frequent occurrence.

Nor should it be expected that the mere change of name is all-sufficient to bring about a relief from such maladministration, bad judgment, and succeeding misfortune; but it no doubt would act as a spur to the sluggish, and by the increase of the gravity of the duties add to the self-respect and caution, the breadth of and time devoted to preparation.

Against the proposed change of name it may be stated in all frankness there exist, to the writer's knowledge, three objections: (1) That the word would not be understood, and the consequence has been erroneously compared to a Greek oration delivered before an audience utterly unacquainted with the vernacular or language; (2) That it would be an assumption of knowledge and an invitation for shafts of ridicule from other professional men, as well as the laymen we meet in daily intercourse; (3) That the Greek root, Stoma, simply means an opening, and would therefore make a more indefinite and incomplete word, and is liable to exceedingly awkward, even ridiculous and extreme, interpretations.

You will recall the admitted natural law that with every change there comes some fresh difficulty to be overthrown. In acquiring a profession, a right, or a title, invariably it may be assumed that the bars raised by conservatism are to be overridden only after exertion that is greater in proportion as these rights and privileges are of advanced value, the inertia and opposition both growing more accentuated as the object is of greater import. In the face of this is the dilemma that it may, and frequently does, follow that condemnation falls upon the one who points out defects and insists upon remedies being adopted; he cannot esteem himself to be *persona grata* to the great masses of mankind, and, if we are correctly informed, he is unjustly classed among those who are accused of hindering progress, and, in the slang of the politicians, are called "kickers."

To the first of the three objections it may be said that the assumption that the word stomatology might be misinterpreted as having something of a hidden reference or genteel allusion to the stomach, is about upon a par with the old-fashioned notions that are met with on every hand as to the enlargement of the dictionary or lexicon. To accommodate and facilitate mental expansion and expedite intelligent communication of thought, this word-building has been steadily going on since long before the days of Shakespeare. The weak, illogical, and untenable opposition here alluded to is likely to be more of the nature of that which improves and strengthens that which it is supposed to object to, as the force of gravitation and pruning does the growing plant. The fact that new words are daily required and coined merely shows that the work of keeping up with the march of progress is sufficient to impose this labor upon the ordinarily intelligent minds, and convince even casual observers of its profit. It is within the history of a few years past how the advent of the ophthalmologist was made the occasion and he the target of many sarcastic shots from the old-time conservative family doctors. It is not improbable that to-day there are whole communities that know little, if anything, of the various specialties and their titles or duties; yet considerable and eminent success has resulted from the work of these classes, with their accompanying cultivation, advancement, and enlargement of the nomenclature.

The lack of ability to understand on the part of the masses would be but a trifling adversity if the word were addressed to them. It is quite contrary to good sense and usage to be held responsible for the ignorance of others whose education we do not supervise. All experience has shown that these, the people, have soon learned to use and correctly apply new words; for example, the somewhat more complicated and vastly more difficult terms of the electrician and the engineer. If newly coined words for the purpose of these professions had been gauged solely by their primary effects upon the masses and the first expressions of the laity, they would have been found to be a difficulty and detrimental to these sciences. The use of such words then would not have been justified in the slightest degree, since they would have delayed rather than promoted the onward movement. Indeed, every trade and calling has its own special and peculiar technical words, which have been adopted and used with very decided advantage in facilitating the exchange of ideas and the production of the finished article, whether it be a brick or a steam engine. In fine, the probabilities are that the new title, stomatologist, would not furnish enough material for a first-class seven-days' wonder, and the ruffle of the calm surface of public opinion would be as trifling as that from a pebble thrown into the ocean, and as evanescent. No weaker line of attack upon the term can well be conceived than to argue that the study of philology and of nomenclature delays other forms of progression. It is holding the trifling penny so near the eye as to eclipse the view of the possibilities beyond. Such an argument does not look as if it could be brought into shape as fair and just. It seems to be a begging of the question, an attempt to substitute another issue and shift the responsibility. Being one of the set forms of antiprogressive argument, we need not longer delay over the grave wherein it has slumbered for years, and from which it is regularly resurrected to be galvanized into a seeming bugaboo for use each time a new subject is introduced that is either above or below the mental scope of the conservative, who imagines his approbation is necessary before any truly elevating step can be taken. It is time this ghost was permanently laid and that the puerile argument was dropped.

To the third and last of the objections may be opposed a contradiction. So far as the original of the word stoma is involved, it clearly meant mouth. Like all primary words, it, by reason of figurative language, came into use for expression of many other meanings, all of which can clearly be traced as arising from the synecdochical or metonymical forms of tropes wherein the word was a prominent one.

Probably sign language, by pointing the finger into the mouth to indicate a hole, gave it the meaning that some seem to fear as a grave and threatening risk of misunderstanding, but which is no more likely to occur than that any sane person should look upon a dentist and a dredging-machine as the same thing because they both work in the mouth.

As a quasi intruder, it is somewhat embarrassing to appear before you to advocate so decidedly unpopular a topic, since by so doing not only my own status, but the reputation of a committee of your own body, may suffer from the selection of so inappropriate a subject. But it appears to involve the standing and life-work of this profession in the near future. Furthermore, it must be at once admitted that during the past summer, at the annual conclave of dentists of America, the warning was shown to me that this word was disturbing the placid quiet and upsetting the auditory ossicles. To use the articulation-entangling title necessarily implied a wonderfully sober headed brain center and practiced island of Reil to grapple with its pronunciation. The signs "Don't trespass here" and "Keep off the grass," etc., were all displayed to me, and, lest they might be misinterpreted, private interviews with explanatory efforts at straightening my mental obliquity were undertaken by good missionary friends. Despite all my desire to avoid rachitic mentality, and my shame over my need of mental orthopraxis to restore an orthoskelic condition again, the tuberculous diathesis has conquered, and it sėems to my perverted vision to be more than ever a duty to return to the discussion.

The country has but recently passed through an ordeal of its financial policy, resulting in an expressed determination of its voters to maintain the standard of values at one hundred cents on the dollar, yet dentists seem to prefer a standard that only represents a part of the field of their liability for duty.

# IMMEDIATE AND REMOTE CAUSES OF THE MALFORMATION OF THE DENTAL ARCH.

BY DWIGHT L. HUBBARD, M.D., NEW YORK, N. Y.

(Read before the First District Dental Society of the State of New York, December 14, 1897.)

It is with considerable timidity that I undertake the discussion of the subject stated, especially before a body whose years of experience have been so many more than my own; but if I may be pardoned for thinking that I can for a short time interest you perhaps to your profit in a phase of the subject which bears more upon interesting scientific facts than upon practical means of treatment, I shall feel that in accepting the invitation of your committee to read a paper I did what every student ought to be willing to do,—*i.e.*, add his contribution to the interest and possibly to the help of others.

In looking over the subject, I have been impressed with the dearth of literature bearing upon it. But there are certain fundamental principles from which we may inductively reason and arrive at conclusions which are positive.

We may well ask at the outset, "What is the perfect physical type of man?" This question is impossible to answer. When we remember that in the evolution of the human race man was yet man when he was nothing more than a particular kind of protoplasm designed to perform certain duties in a certain habitat, yet with the characteristics belonging to his race, few though they may have been, and from that small beginning developed in mold and form and progressed in faculties through the ages until he became the creature beautiful in form with conquering intellect, we find that we are still at a loss to determine what is the perfect man, and must look beyond into the ages to come, and by flight of the imagination see him crowned with honor and glory for what he has achieved and made partaker of the fruits of the highest creative genius. It is interesting to conjecture what manner of man he will be when all traces of rudimentary structures have passed away, if that be a possibility. But it may be that when he has lost a few more vertebræ, as he has now lost all but the rudiments of a caudal appendage, a few more teeth, and is no longer afflicted with an appendix vermiformis, he will finally reach that highest estate to which he is destined. But seriously, the only conclusion at which we may arrive is that the perfect physical form is that which according to the prevailing type is most useful, and which performs its functions most perfectly according to the environment in which it is found.

Man, more than any other creature, because of his intelligence, is liable to suffer from the effects of his perversions of the laws of nature. The very intellect which makes him a ruler in the earth also makes him his own worst enemy, and through constant disobedience of nature's laws distorts the processes of his own development, thus causing him to depart from his type more readily than the lower animals. The "reversion to type," which is nature's law of restoration as well as a reminder of the past, is his only salvation from complete annihilation.

I refer to the evolutionary development of man because in this theory we have many explanations of good and bad formations. The part upon which we have concentrated our attention is not the least important. In fact, the division of the animal kingdom into classes is made largely with regard to the organs by means of which the body is nourished,—viz, the carnivora, the herbivora, and the omnivora. The best and most perfect development of the jaws, therefore, is that which indicates the greatest accommodation to environment and best subserves the purposes of the individual. This is found at the present time to consist of an upper arch and, accurately speaking, a lower elliptiform arch, each containing sixteen permanent teeth, of which two in each jaw may be said to be supernumerary, with occluding surfaces between upper and lower posteriorly with relation to the inherent herbivorous characteristics, and anteriorly, or those which define the carnivorous traits, we find single cusps which do not occlude. To finish the architectural design, the whole is crowned by a supporting dome ever strengthened by an increasing tendency to greater convexity.

I would separate the causes of irregularity into the two accepted divisions, hereditary and acquired. It is difficult to make such an arbitrary division, for the local and constitutional causes are so dependent for their malevolent operations upon inherited tendencies that the variations seen in each case force us to believe that the one is a necessity to the other. In order to achieve a thorough understanding of the relation of acquired mechanical local causes to development, it will be well to consider for a moment the process of development from the fetus to maturity. Tomes says, "It will be seen that the arch of the jaw in the fetus is as wide and as large as in the adult, the difference between them in this part being simply due to addition to its thickness to a slight extent on the inside, but very much more on the outside of the jaw. It is also true that the increase in size in the adult jaw is gained exclusively by its prolongation backward, and not by anything like interstitial growth. Although the bones of the alveolar arch are lengthened and the arch is rendered more elliptical, it is not widened. The widening of the jaw, in correspondence with the increasing width of the skull, takes place behind the alveolar arch in the ascending portion, and is affected by the progression of absorption on the inner and addition to the outer surface of this part."

It will be seen, therefore, that the growth of the anterior parts of the lower jaw is produced by the addition of bone to the anterior surfaces rather than to any material increase by the development of bone in the fibro-cellular tissue which up to this period unites the two halves. The period of activity for this development appears to be limited to intra-uterine life. After birth the process of growth in this direction is all but suspended until the period arrives for the osseous union of the two halves of the jaw, when the action is resumed, the fibro-cellular tissue being replaced by bone. It will be deduced from the above, which is essentially the discovery first recorded by Kölliker, that in whatever direction the jaw has increased the increase has been produced by additions to the external surface. There are no indications of interstitial growth within and throughout the whole substance of the bone. We are led from these principles of development directly to the results as to time and methods of the occurrence of malformations of the face when some of the accompanying exaggerated conditions of these and collateral parts are considered. In this connection I wish to refer to some of these as etiological factors, but with particular reference to abnormal conditions of the nose, naso-pharynx, and pharynx during the period of early childhood and adolescence. Among these conditions I would name as of common and easy production, exercising the most direct bearing in the causation of deformities of the upper and lower jaws, deflections and spurs of the nasal septum, hyperplastic enlargements of the turbinated bodies, lymphoid hypertrophies in the pharyngeal vault, accompanying hypertrophy of the tonsil glands and hypertrophy of the lymphoid tissue at the base of the tongue. It is not necessary to state that these are more or less readily formed according to the dyscrasia of the individual, whether it be scrofulous, syphilitic, tubercular, or of any character which by its inherent nature predisposes. It has been found from the examination of skulls that ninety per cent. have deflection of the nasal septum. From these statistics we might justly draw the conclusion that deflection of the septum is either hereditary or, at least, congenital, possibly in part due to traumatism during birth. Deflection in a skull would indicate a deflection in the triangular cartilage of the septum, as the cartilage always follows the same line of curvature as the bone. By pressure of this convexity we find direct injury to the middle and inferior turbinated bodies of the same side, with consequent hypertrophy, and on the convex side enlargement of the other turbinated bodies through overtaxation brought about by the unusual quantity of air attempted to be breathed. Nasal stenosis is the result, causing mouth-breathing. Going back now into the naso-pharynx, that part which according to its good or faulty construction affects breathing, speech, and hearing, we find much that will interest us. This part has, until within the last few years, been a "terra incognito," and as we walk our streets we see daily the results of neglect of this important region; faces more or less idiotic in expression, and jaws deformed which ought to have been permitted to exercise their usefulness and give beauty and grace to the features. Luschka's tonsil, or, as it is properly and physiologically called, lymphoid tissue, is a normal structure placed there for the purposes of lubrication and protection.

Together with the constitutional tendencies above named, this tissue is very prone to hypertrophy. Where parents are and have been for generations prone to lymphoid enlargements, the tendency is apt to be the same in the offspring. It is well known that children of the same family are generally possessed of the same difficulty in this regard. An examination of the parents, and particularly of the mother, almost invariably shows the presence of the same condition, although less in degree, as absorption takes place after puberty. Bosworth says, "The disease is essentially one of childhood, developing in infancy, and probably not infrequently being congenital." Other observers claim an almost invariable congenital history. It is in the formative stage stated at the beginning of this paper that the greatest amount of damage is done. How deformity of the jaws from this cause is brought about is easily seen,—viz. pressure. There is pressure in all directions but two, upward and downward. Posterior pressure upon formative bone-structures is transmitted to the developing brain-structures, which thus acted upon hinder development, mentally and physically, causing a reversion to the ape-like type of heavy and protruding jaw; pressure laterally, widening the posterior angles of the face, and pressure forward, obstructing respiration after birth and causing mouth-breathing. We have then, beginning in intra-uterine life and continuing to puberty, one explanation of the too large and protruding jaw, making proper occlusion of the molars and a proper cutting position of the incisors an impossibility.

It has been stated that soon after birth there is a cessation of the formative process. This is the period of greatest activity in lymphoid structures. It is the time when the dormant powers are overcome by force by the ever advancing and growing tissue. During entire adolescence there is a continual battle between the opposing forces, the one developmental trying to perfect, the other opposing and generally coming out the victor. We can infer what the shape of the arches thus acted upon will be: triangular and not elliptical. In the upper, a high and crowded triangle instead of a rounded dome with a proper width of keystone; in the lower jaw we have width, the rami being forced apart in the attempt of its condyles to follow their corresponding glenoid cavities. Further than these physio-mechanical causes, we have, as has been hinted, the constant lowered position of the jaw favoring abnormal development in the direction of least resistance. Also under the circumstances named, "the breathway is confined to the mouth and the pressure of the current of air is exerted upon the bony structures of the buccal cavity, and more or less deformity of the upper jaw almost invariably results. The hard palate is pushed upward, the dental arch is narrowed, and the teeth grow irregularly and decay early in life. Respiration carried on through the mouth diminishes the air-supply to the lungs. As a consequence, they are never fully expanded, and the chest-walls sink in, giving rise to the familiar deformities known as sunken sternum and pigeon breast. Not only are the effects of deficient air-supply shown in the shape and size of the chest, but the whole body is additionally poorly nourished. The injurious body effects may not become apparent until childhood has passed and youth is reached." (French.) All of these conditions favor the development of a crowded arch anteriorly, giving the expression to the face known as the "frog face."

About ninety per cent. of the cases of lymphoid hypertrophy of tissue in the pharyngeal vault are accompanied by hypertrophic amygdalitis, with adhesion of the anterior pillars of the fauces to the tonsils. Here, then, is another obstruction, and in early childhood there seems to be little doubt that the tension exerted upon the velum palati by the adherent pillars during the act of deglutition is also a factor in deforming the upper jaw. I have already referred to hypertrophy of the glandular tissue at the base of the tongue. Although of slight consequence as an etiological factor, its presence causes obstruction by narrowing the faucial space, making deglutition additionally difficult and mouth-breathing a still greater necessity. Garretson, referring to the tendency in children to self-correction of irregularities of the teeth, says, "Early interference is to be deprecated, except where it is evident that mechanical impediments render such self-correction impossible." He implies that the correction of the irregularities is impossible unless the mechanical impediments are removed.

I have spoken thus far only of cases according to a common rule of development and not of any exceptional condition. Many anomalies of etiological significance are found, among which may be mentioned many varieties of tumor, including as of special significance myxomatous polypi in the nasal chamber and in the maxillary sinus in adults. A very interesting case of symmetrical hyperostosis is given in Guy's Hospital Reports, London, 1870. Syphilitic impressions are of importance, handed down from generation to generation, leaving such an impress upon the features that they become pathognomonic.

I have merely referred to fetal enervation and faulty nutrition, and I would not take your time for a consideration of these except to say that they are coincident with the abnormalities already considered, and that the mere presence of the deformities named is *prima facie* evidence of faulty nutrition both pre- and post-natal.

Cases of velo-palatal insufficiency are not exceedingly rare. These cases are simply a congenital abnormality due to arrest of development, not of the velum palati, but of the palatine vault, the shortness of the velum being only apparent; the real shortness exists in the bony vault. I will refer to two cases of this reported by Dr. Egger in the *Ann. des Mal. de l'Oreille du Larynx*, Paris, April, 1896:

*Case 1.* A young man of eighteen years, affected with a double inguinal hernia, and presenting adhesion of the lobules of the ear, had had a nasal voice since infancy, and suffered from short respiration; there was no marked difficulty in deglutition. The velum of the palate did not come in contact with the posterior part of the pharynx during the emission of his "A," and not even during efforts of vomiting. The distance between the uvula and the posterior wall was fifteen millimeters.

*Case 2.* A strumous subject of fifteen years had a nasal voice and chronic coryza. He was affected with the same deformity. He could breathe only through the mouth. The velum palati cannot touch the pharyngeal wall, and is besides adherent to the two tonsils.

I have selected these two cases that I might be able to show how many of the conditions already referred to are fulfilled, showing the unmistakable impress which the inherited strumous tendency exerts, both directly and indirectly, upon their production. In Case I there is a double inguinal hernia, showing muscular insufficiency, adhesion of the lobules of the ear also showing faulty development. In Case II the subject is distinctly strumous, being affected with chronic coryza.

I have purposely avoided reference to thumb and nipple sucking, for I fail to see how it is possible to carry it to the extent which will cause marked deformity in children otherwise well formed. I am inclined to think that this is one of nature's wise provisions which would tend to prevent direct occlusion of the anterior permanent teeth.

Carrying out the principles stated in this paper, I have attempted to show that where the upper arch has not a natural convexity the cause will generally be found in contiguous chambers. Thumb-suckers and persistent nipple-sucking children, as a rule, have no obstruction to respiration, the two conditions being by their very nature incompatible.

It would not be within the intended province of this paper to enter upon the consideration of cleft palate, except to call attention to the fact that cleft and hare-lip are illustrations of the liability of these parts to congenital and inherited deformity. It will be remembered that in the process of fetal development the inter-maxillary process comes from above downward in the median line from the frontal region, and that the palate is formed by the growth of a horizontal plate between the mouth and nares. At this stage of formation these plates assume the direction in which they are guided by any rudimentary tissue which may be present. So in the consideration of cleft and hare-lip we have only another stage of the processes already described. I refer, of course, only to those cases in which hypertrophic tissues are congenital.

I will leave the discussion of irregularities of the permanent teeth caused by faulty growth and eruption of the temporary teeth, as also the bad practice of too early extraction, to those more competent to speak.

I know that I have tramped over ground well trodden before, but if I have succeeded in emphasizing some of the points which you already know, and by inference pointed out some untried means of rational treatment which will assist the methods generally adopted, I will have added to the pleasure I have in being the recipient of your courtesy.

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# A METHOD OF INSERTING GOLD FILLINGS WITH THE USE OF HAND BURNISHERS, AS PRACTICED EXCLUSIVELY FOR TWENTY YEARS.

BY DR. HENRY F. LIBBY, BOSTON, MASS.

(Continued from page 188.)

## SECOND PAPER.

It is my purpose, in this paper, to give a description of several operations (with illustrations) on the upper centrals, showing cavities on the approximal, labial, and palatal surfaces. The means employed in shaping these cavities, as well as the instruments used in manipulating, are equally practical for cavities in all incisor teeth, except in the distal surfaces of the cuspids, which were described in the first paper in the DENTAL COSMOS for March.

The teeth shown in Fig. 29 have been mechanically separated, and are opened on the palatal surfaces. The labial wall is left, and is sufficiently strong to allow the molding of the gold against the enamel. It may be observed that the entrance to the cavity is similar to those prepared in the bicuspids, already treated. In these cavities a slight retaining groove is made at the cervical walls with a No. 1 round bur. On the opposite side, toward the incisal edge of the tooth, the same size bur in the right-angle hand-piece will form a retaining groove. A pit is now made at the cervix of the left central with a hand drill the size of a No. 1 round bur, and this is filled with cohesive gold, by direct pressure, using a corkscrew point No. 6, Fig. 30. Continue with this point until the mass is large enough for the point (Fig. 32) to be used in burnishing. With these two points the cavity is filled. After polishing, the filling is slightly convex. The only change in filling the right central is in the use of No. 5 corkscrew point (Fig. 31) and an obtuse flat burnisher (Fig. 32) in forming the contouring surface.

To make the illustrations clear to those who did not see the former paper, I will say, briefly, that the line across the points shows the burnishing surfaces; and the corkscrew points most used are Nos. 5 and 6. Should any one take the trouble to determine the relation of measurement between these points and a No. 1 round bur, by the S. S. White bur gauge, it will be seen that the extreme ends of the points just enter the one-half size. This exact one-half size leeway is necessary to insure the easy and adaptable movement required in molding the gold into the grooves, or in entering the retaining pits. To verify this remark, a simple experiment may be tried with any corkscrew point. Take a tooth-brush handle, and in the extreme end make a cavity like one in Fig. 29; the eye will easily determine the size of bur required to make the groove that the corkscrew point will loosely fit. A better and more satisfactory plan is to fill a cadaverous tooth; the result to be seen by breaking the tooth should show the adaptability of the gold to the structure of the tooth.

FIG. 29.

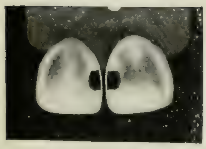


FIG. 30.

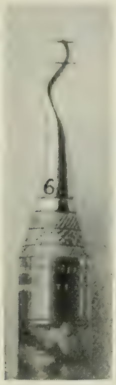


FIG. 31.

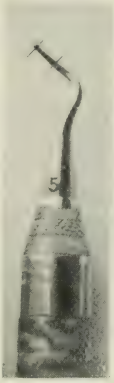
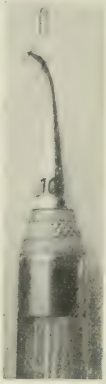


FIG. 32.



It is not an unusual thing to fill these cavities without separation, and this is accomplished by merely wedging the gold against the opposite filling during the progress of the work, thus getting a good contour and obtaining very gratifying results.

The preparation and filling of this type of cavity has been followed out for ten or twelve years with a marked advance over previous years in avoiding discoloration and arresting decay.

During the last twenty years I have had a wide experience, trying various schemes for preparing cavities, and in all I have found favorable conditions for burnishing. I say this for the purpose of encouraging those who have their prejudices already formed, in shaping cavities, not to hesitate where there is ample room. Without interruptions, these two cavities are prepared, filled, and finished in one hour and fifteen minutes.

Let us continue with larger cavities on this same surface. Fig. 33 shows the cavity after its preparation. Occasionally we find a cavity, as represented above, with the labial wall intact. In this the retentive groove at the cervix extends from the labial wall to the palatal in a crescent shape, emerging on the palatal surface in a generous groove, made with a No. 1 round bur. If there is only enamel left at the cervix, having no appearance of chalkiness, it can be well sustained by dentin, as the groove can be cut in reference to this without endangering the pulp. At the incisal edge of the tooth the same size bur may be used in cutting a groove in healthy enamel and dentin, as shown in the last figure. It will be seen that there still remains in this delicate operation some dentin to support the enamel at the incisal edge. It may be well to state that it is not an inevitable rule to preserve a weak corner like this; there are exceptions where the occluding lower teeth do not meet this weak point. The motive for carrying this case so far is to illustrate how the gold can be molded into a cavity of this kind with perfect safety, and withal made so tight that it will not discolor under the labial wall.

FIG. 33.

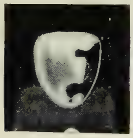


FIG. 34.

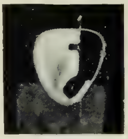
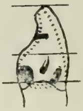
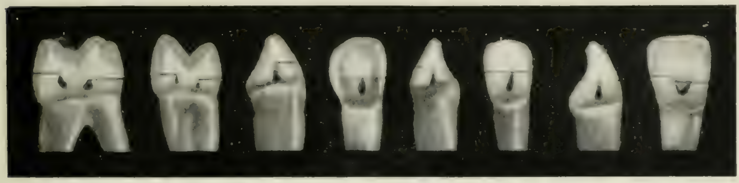


FIG. 35.



To carry this work one step farther we will remove both palatal and labial walls entire, as in Fig. 34, and proceeding with the same intention, namely, to retain the filling by carrying the groove on the thicker portion of the palatal surface close to the gingival line. (In the treatment of all the cavities we will suppose the pulp to be alive and healthy.) In this exceptional case the pulp, of course, has resisted the march of micro-organisms along the fibrils and possibly receded; however, we will not consider that it has, and will proceed with all care in cutting the grooves. In connection with this I will introduce a few teeth, ground in such a manner that the body pulp, with its prolonged terminal horns, comes into full view, as shown in Fig. 36. My purpose in doing this is to determine quickly, with comparative accuracy, its boundary. I do not wish readers to infer that I suppose they require an illustration to show its location. The teeth selected for this purpose are shown in their natural size, and are free from all diseased conditions. They came into my possession without any statement of the age when they were sacrificed by the patient; therefore, strictly scientific accuracy in this particular cannot be expected. We will simply regard the practical side. The lines drawn across the teeth intercept the extreme portion of the pulp, and it is found that this occupies the upper half between the termination of enamel at the gingival line and incisal edge of the tooth. In the lateral view may be seen the freedom with which we can cut, and also that the grooves made at the cervix and incisal edge have not endangered the pulp in the least. The photographs represent the right central, lateral, cuspid, first bicuspid, and first molar, with their labial, buccal, approximal or side views.

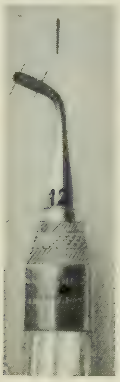
FIG. 36.



Having the cavity prepared, I would start the filling by making two diverging pits the size of a No. 1 round bur. I prefer this to cutting deep retaining grooves, which must necessarily be deep enough to hold the first cohesive pieces, or soft cylinders. I rarely trust non-cohesive gold for a base in any of the incisor teeth; there is so little to be gained in time, and nothing in preservative qualities. These cavities are so unlike those of the bicuspids, which were treated in the March number, in depth and remoteness, that the use of soft gold seems unnecessary. Here we have plenty of room, and a cohesive material that has all the advantages of soft foil, for it has not received a blow to temper or harden it, and we have preserved a quality of texture and plasticity which hammered gold does not possess. The filling is started in the retaining pits and increased in size, by direct hand pressure, until the gold is visible. The work then is carried forward by the corkscrew and flat burnisher until completed. On the opposite side the larger foot point (Fig. 37) comes into play with the corkscrew. One hour and a half is required for this operation.

Next we will restore a portion of a central incisor, as shown in Fig. 34. Very few directions can be added to those already given in the preparation of the last cavity, but I would suggest a deeper and wider groove at the cervical wall, and extend that to the palatal surface in a strong dovetail. This, in opposition to another nearer the cutting-edge of the tooth, furnishes anchorage enough. The drawing in Fig. 35 shows the principle. In this figure the retaining grooves simply have reference to one method of obtaining anchorage for the filling. I think I can safely say that during the last six years I have dispensed with the groove on the palatal side, near the incisive edge of the tooth, in at least two-thirds of these operations, and have depended upon the crescent-shaped groove shown in the drawing. Where the upper horn extended under the labial plate of the incisor, I have carried this downward and vigorously cut a dovetailed groove into the large portion of the tooth near the gingival line or gum border. In any one of these cases there is not the least retaining point or groove on the incisal edge. It is evident that if the filling can be held securely in this way, we have overcome two obstacles which we frequently meet in our daily practice. First, there can be no discoloration, as there are no undercuts; secondly, avoiding the undercuts, we do not anticipate a fracture. Unquestionably, it has already occurred to the reader that there must be an advantage in this mild method of welding gold; this cannot be overestimated, as structure of the tooth, or the material itself, has not received a jar or sudden shock. In this instance the repose of the gold crystals in the solidifying process is naturally conducive to perfect adaptation without disintegration; whereas if any mechanical means is used, such as malleting, it is a well-known fact that a sudden blow is not limited to the point of contact, but rather loses its motive impulse along the molecular structure of the opposing body, whether it be the gold or the enamel.

FIG. 37.



As before, the filling is begun in a retaining pit, with No. 40 folded gold, continuing the use of the corkscrew No. 5 or 6. With this advance beyond the walls; then follow with No. 60 folded gold, as it accelerates the work; but I am not convinced that the filling is made more dense by this means.

Now, during this building out, let us suppose that an accident occurs and floods the gold with saliva; the treatment that applies to this case will be practical with other fillings wherever moisture is present. If the dam is at fault, readjust it; dry the tooth and filling. Alcohol is excellent, as it has a strong affinity for water; then, with the aid of the warm-air syringe, the parts are quickly dried. Then take an instrument which has such a cutting angle that, when drawn down or across the filling, it will take a clean shaving from the surface. Wipe the instrument, and continue shaving down until the entire surface is fresh; after which the gold ought to cohere as strongly as did the original pieces. I have not been successful in attaching gold in this way to old malleted fillings, and have concluded it was due to the pitted surface, which could not be freed from moisture. In this method of filling teeth we have a safeguard constantly with us. It coheres or it does not cohere, as I have said before. If it does not, moisture from some source is still present, or the instrument has taken some secretion from the tooth during the molding process. Don't be alarmed, but clean the surface and try again. There should be a word of caution about annealing. Gold will cohere feebly if unannealed (and a very perfect filling can be made), but it is always essential, as is well known, that it be passed through a flame, or receive in some way a high temperature to render it extra cohesive. The time required for this operation, without accident, would have been two hours. I am at a loss for words that will induce a diffident person to attempt this operation; therefore, I once more urge every one who is interested in what has been said to practice for an hour or two on a cadaverous tooth; after which pry out the filling, try to pick the plug apart, or flatten it by hammering. It should stand these tests without cleaving, and should be dense, having the appearance of a molten mass.

(To be concluded.)

## A DENTAL ANOMALY.

BY EDWARD C. KIRK, D.D.S., PHILADELPHIA, PA.

THERE have appeared in the pages of the DENTAL COSMOS frequent accounts of anomalous teeth situated in the incisor region; and with a view to increasing the record of these cases as a basis for future study and classification, the following unusual specimen is here reported.

The cranium bearing the anomaly was obtained from the curator of the dissecting room of the University of Pennsylvania. Further than this no history is obtainable.

Fig. 1, giving an anterior view of the upper maxilla, shows absence of the central incisors. The right incisor accidentally dropped from its alveolus, which accident was not discovered before the photograph was taken. The tooth is shown in position in Figs. 3 and 4. The alveolar border at the position of the left central incisor contains a shallow alveolus, looking as though it had been occupied by either a deciduous incisor, of which the root had undergone much resorption, or by an imperfectly developed permanent incisor.

Projecting from the labial face of the alveolar border, between its free margin and the nasal floor, is an irregularly formed mass of tooth-structure, showing enamel and cementum; the general appearance of the projecting mass being similar to that described by Dr. V. Walter Gilbert in the specimen reported by him.*

Fig. 2 shows the specimen with a portion of the alveolar walls dissected away, and, beside the roots of the main mass, reveals the presence of a group of small additional supernumerary teeth of the usual conoid form. A considerable elevation of the floor of the left nasal chamber, caused by the presence of this tooth-mass below it, is shown by the high light in the illustration.

FIG. 1.

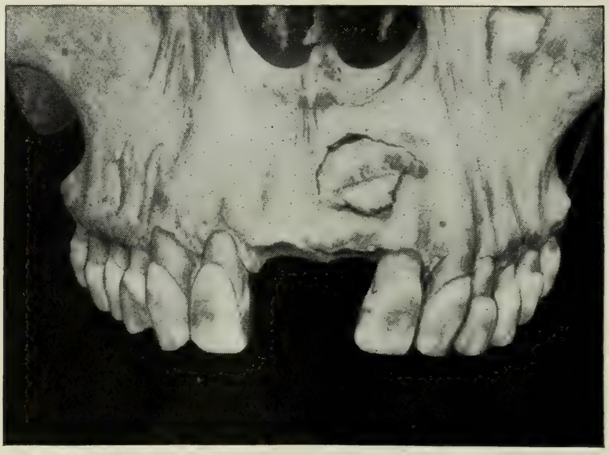
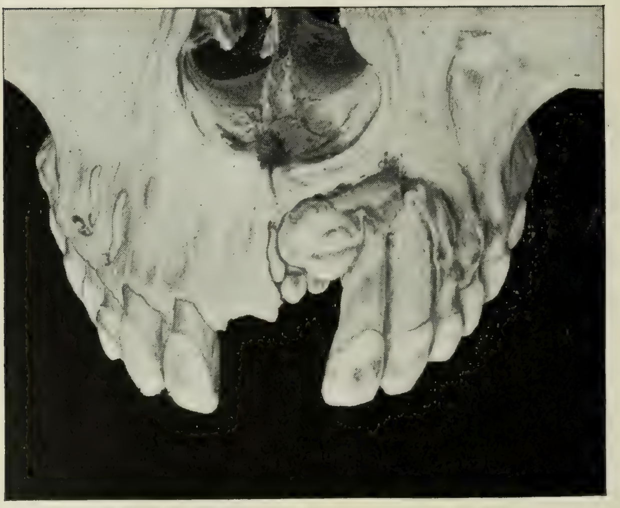


FIG. 2.



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*DENTAL COSMOS, January, 1898, p. 35.

FIG. 3.

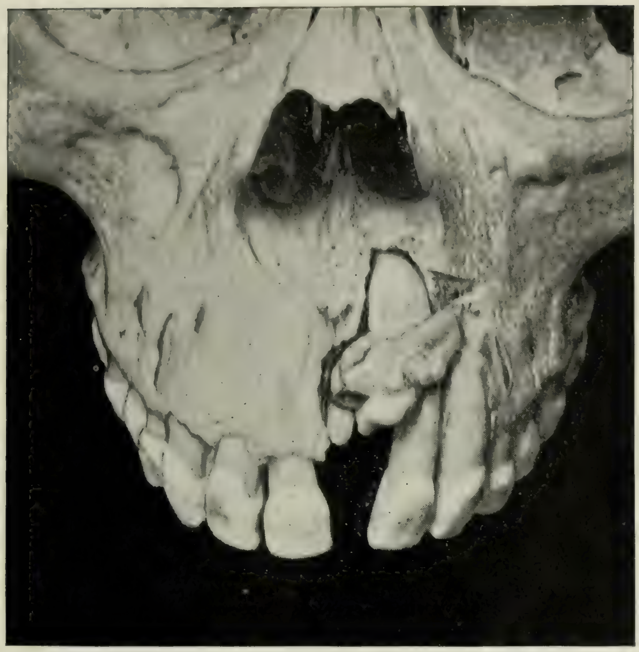


FIG. 4.

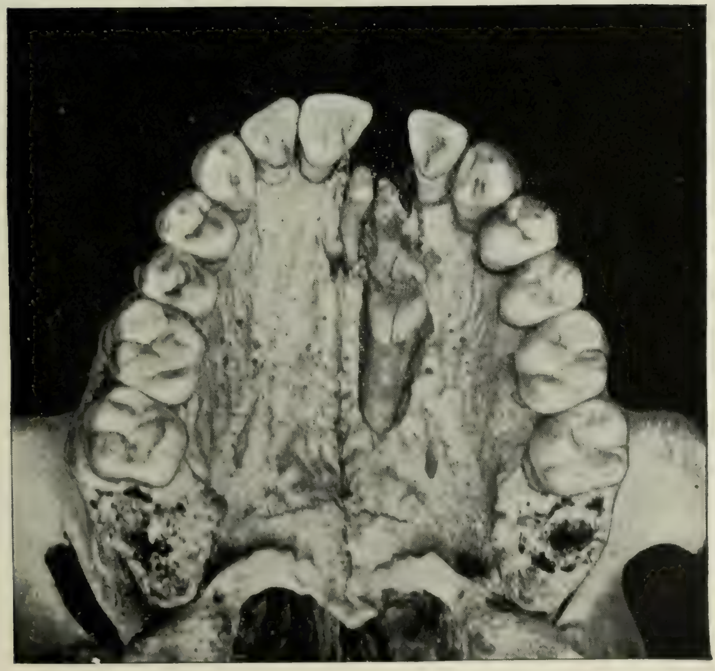


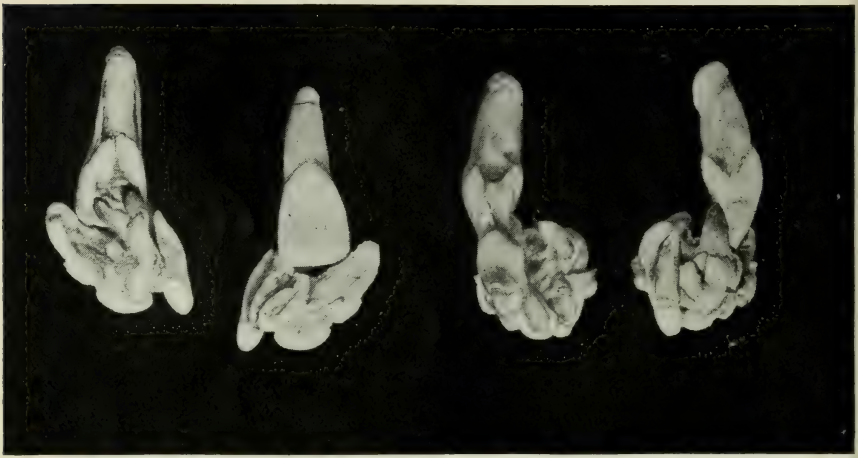
Fig. 3 is a dissection backward, including a portion of the nasal floor, showing the labial surface of the normal incisor posterior to the anomalous tooth-mass.

Fig. 4 is a palatal view, with the bone further dissected away; and there is shown not only the number and position of some of the supernumerary teeth, but the lingual aspect of the unerupted normal left central incisor, occupying an antero-posterior position behind the anomalous tooth-mass and parallel to the plane of the palatal process.

Fig. 5 shows four different views of the normal incisor, with its groups of supernumerary satellites in their correct relative positions to one another.

Beside those shown in the several illustrations there were a number of smaller ones, making in all thirteen teeth in the group.

FIG. 5.

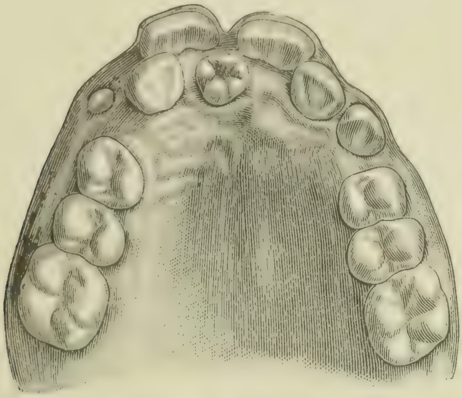


It is a matter of interest, as bearing upon the etiology of these curious formations, that in nearly if not all of the cases of this character reported the basal form of the tooth or teeth has been conoid and typical of the primitive tooth form of the evolutional series. Either the anomalous tooth is of the simple cone-shaped variety, or it consists of multiplications of the conoid tooth fused together into a single tooth-mass. In many instances the conoid form has suffered distortion in the process of tooth development, but even then the conoid tendency can be readily discerned.

The following case (Fig. 6), sent by Dr. H. H. Johnson, of Macon, Georgia, the model of the mouth of a boy aged eleven years, shows one of these supernumerary anomalies of the incisor region in which the conoid type is evident in the form of the crown, which has cusps, indicating as many cones laterally fused into a single multicuspid crown.

Those who advocate the evolutional theory of development are inclined to explain these occasional appearances on the hypothesis of atavism. As under certain circumstances the tooth-forming epithelium may express itself in these conoid aberrations from the normal type, and in so doing produce a result which simulates a tooth-form belonging to a group of organisms low down in the evolutional series, to that extent the process may be regarded as evidence of atavism. It is, however, far from reasonable to regard the nutritional disturbance which brings about these peculiar products as due to atavism, not only because the reversion is toward a type much too far removed from man in time, but still more so for the reason that the condition is one which is more likely to be satisfactorily explained upon pathological grounds.

FIG. 6.



The writer is indebted to Dr. M. H. Cryer for the excellent photographs from which the half-tone illustrations are made, as well as for the dissections which brought the specimens into view.

# CORRESPONDENCE.

## "FACULTIES VS. EXAMINERS."

TO THE EDITOR OF THE DENTAL COSMOS:

*Sir,*—It would be useless for me to reply directly to the statements made by the editor of the *Items of Interest* in his reply to my communication, because I am at a loss to know whether he is speaking figuratively or literally. For instance, he speaks of a "six-inch cube investment," a monstrosity which I have never seen, and adds to this "bars of iron" and "sheet-iron castings." I suppose if I should comment upon this I would be finally "placed beyond the pale of professional recognition" by the editor, because I gave to it a literal construction. However, I desire a little space for a few comments.

I took exception to some of the statements made in his editorial regarding the state examination in New Jersey. I will not quote the paragraph, which has already been quoted twice in the COSMOS, but I ask for a consideration of his explanation of the construction of that paragraph; also Dr. Barlow's opinion in regard to it, taken from his letter and introduced as a part of the editorial. The editor says he used the phrase, "All had from three to ten times as much investment as there should have been," figuratively, and takes issue with me because I took it literally. He says, "I [the editor] had a right to employ a phrase in common use among writers without supposing some young graduate would accept the words literally, as though I had been tabulating statistics." He then says, "It is a fact that my words were also literally true." If they were literally true, why does he object to my literal construction? Why did Dr. Barlow state that he supposed it was used figuratively? He surely had a most excellent opportunity of knowing whether it was literally true or not. I insist, Mr. Editor, upon my former claim that it was not literally true, and I believe it to be an unjust reflection upon both candidates and colleges.

Again, the editor says that he imagines many practical men will agree with him that a full denture should always be placed in a furnace, or at least a bed of charcoal, before pointing the flame; and then adds, "Perhaps even the beloved professor would admit so much." In reply, I will say that this view is in direct accord with the teachings of the professor to whom he refers, although these are facilities neither of which were offered at the New Jersey Commissioners' examination in July last. I cannot recognize the editor of *Items of Interest* as the only criterion in dental science; neither can I fully comprehend the figurative and literal constructions of his editorial, both of which he has placed upon it.

Respectfully yours,
ARTHUR E. GUPTILL, D.D.S.

AUGUSTA, MAINE, February 24, 1898.

# PROCEEDINGS OF SOCIETIES.

## OHIO STATE DENTAL SOCIETY.

(Continued from page 134 )

### SECOND DAY—*Morning Session* (Continued).

DR. H. T. SMITH, Cincinnati, read the following paper:

### THE COAGULATION THEORY.

Not long since I came across the following statement in the editorial pages of the *International Dental Journal.* It is headed, "The Coagulation Theory," and reads: "The discussion on this subject, which has taken a wide range and claimed the interest of many minds for years, seems to be drawing to a conclusion, if the very thorough experiments of Dr. E. L. York are to be accepted. These investigations clearly prove that a coagulant such as carbolic acid does diffuse through dentin, notwithstanding assertions made to the contrary, and does not form an impenetrable coagulum at the orificial ends of the dentinal tubuli. These investigations substantiate those previously made, and, conjoined by those made by Dr. Bethel with silver nitrate, form a series of facts that clearly settle the question." I thought it might be interesting to look up the points at issue and to forecast if possible the conclusion spoken of, and at the same time call attention to some points in the therapeutics of root-canal treatment as they occur.

The question originally at issue in the coagulation theory was whether or not a medicament which has coagulating properties, if used in the treatment of root-canals, so seals the mouths of the dentinal tubes as to prevent the further ingress of itself or of another medicament afterward used for antiseptic treatment. In other words, are carbolic acid and zinc chlorid self-limiting in their action, and, if so, are they contraindicated in the treatment of root-canals? It involves also this question, which is quite as important: Is the product matter from a putrefactive pulp capable of entering the body of the dentin, and, if so, is it also capable of infecting the pericemental tissues, causing what we recognize as lame teeth?

Looking into the first question, the diffusibility of coagulants, Dr. Harlan's experiments were probably the first made, and were about as follows: The pulps of freshly extracted teeth were removed, the ends of the roots sealed, and the teeth planted in plaster of Paris. Cotton moistened with carbolic acid in the one case, and with wood creasote and zinc chlorid in the others, was carefully packed in the root-canals. At the end of forty days tests were made in the plaster of Paris for the presence of the coagulant, and none was found. When the essential oils, cloves, cassia, and eucalyptus, were used, it was found after four hours that the oils had plainly penetrated the dentin. By adding carmin to the oils, the degree of penetration was distinctly followed. When solutions of silver nitrate were used it was found not to penetrate the tubules to any extent, and it was classed as self-limiting with the other coagulants. The silver nitrate furnishes its own stain, and the degree of penetration was easily defined in sections of the roots. In another set of experiments Dr. Harlan immersed the teeth in starch solution up to their anatomical necks, after treating the canals with coagulating disinfectants and iodin. The characteristic blue color did not appear in the starch solution, hence he concluded that the coagulants were a bar to their own diffusibility. We cannot but believe that these experiments were carefully made and the results accurately reported.

The other side of the question is best represented by the recent experiments of Dr. E. L. York upon the diffusibility of coagulants in dentin, to which the editorial quoted refers as those that settle the question.

Using a number of teeth with both normal and putrescent pulps, Dr. York prepared them about as Dr. Harlan did. He injected into the canal of one a ninety-five per cent. carbolic acid, which had previously been colored with a small quantity of fuchsin. The tooth was sealed and wrapped in moist gauze, and was kept at a temperature of 98° F. to simulate the conditions in the mouth. In about eighteen hours the carbolic acid had passed through the dentin, as shown in sections of the root. This experiment was repeated a number of times, so that no doubt as to the result was left in the experimenter's mind. In other experiments the teeth were suspended in water and the test for carbolic acid made with bromin water, when it was found that the carbolic acid had penetrated the roots in about eighteen hours. Next, in order to demonstrate that carbolic acid does not form an impenetrable coagulum at the orificial end of the dentinal tubuli with their albuminous contents, one of the teeth that had contained carbolic acid in its root-canal for seventy hours was used. The canal was dried and the saturated solution of sodium chlorid was sealed in it. The tooth was suspended in water, and after three hours the water was tested for the presence of the sodium chlorid, using a drop of silver nitrate. The result showed a quantity of silver chlorid thrown down, proving that the coagulum formed was not a barrier to the passage through the dentin of other medicaments used in root-canal treatment. He found also that carbolic acid placed on the white of a boiled egg shows marked diffusibility, from which he infers that carbolic acid is not self-limiting in its action, but penetrates its own coagulum.

Now, here are two sets of similar experiments with exactly opposite results. Which are we to believe? Some one says that it is a question of veracity, but it seems to me that the always possible differences in the dryness and age of the teeth used, and the variations in the quantities and percentages of the solutions used, should be given full consideration in the results. Dr. Truman says the question is settled in favor of the diffusibility of coagulants; hence it is still good practice to use carbolic acid in root-canals. There is, however, one point that the experiments do clearly show, and in this they have perhaps chief value. It is said that the essential oils are very much more diffusible than the coagulants, and for this reason they have a distinct advantage over the latter in certain instances of root-canal treatment; and perhaps the mistake is made when the question is not allowed to rest with this comparison, but is pushed to the ostracism of one or the other class of medicaments.

A few observations I have put down as they occurred in looking up this question. The first is the statement of Dr. Bethel about the use of silver nitrate. If applied without the use of cataphoresis it is practically self-limiting, and even with the aid of cataphoresis there is little or no danger of forcing the silver nitrate through the whole extent of the dentinal tubules and causing injury to the peridental membrane.

Another observation is the statement that capillary attraction does not come to our aid, as had been supposed, in the rather difficult operation of forcing chloro-percha and medicaments into closed tubes such as are most root-canals. Experiments show that capillary attraction only takes place in minute tubes that are open at both ends; therefore, the solubility of chloro-percha in oil of cassia and other of the essential oils is certainly to be taken advantage of by treating the canal, just previous to filling, with one of these oils.

Another observation is the radical statement I found, that the successful treatment of pulpless teeth depends first upon the exclusive use of diffusible disinfectants, and secondly upon the repeated and continued application of the disinfectant dressing for a considerable length of time. This statement excludes the use of carbolic acid, mercuric chlorid, and other antiseptics, and opposes the accepted custom of immediate root-filling, which is certainly good practice in many cases. And, finally, in regard to the future of root-canal treatment, I have only to say that whether or not the advances will be in the line of mummifying pastes or chemicometallic methods, or will remain a process improved along the present lines of practice,—that of dragging out each particle of nerve-tissue to the end of the root and the end of the hour,—it is difficult to say, but it is sincerely to be hoped that the improvements will be effected in the methods as well as in the medicaments.

### *Discussion.*

Dr. L. P. Bethel, Kent, said that the subject was of great importance to dentists, and he hoped that more exact results would soon be obtained. As to his own experiments with silver nitrate, they were not made with the view of determining the coagulable properties, but rather to determine the effect on tooth-substance of silver nitrate used in connection with the electric current. As to the statement in the paper regarding the use of silver nitrate, it is true that a simple application will not penetrate to any great depth; but with cataphoresis, twelve volts for five minutes, you get more penetration, and with greater current and more time much greater penetration. He had made no experiments to determine the diffusibility of coagulants and non-coagulants. He thought that those who had made investigations in this direction had done very creditable work, each in his own way, and had labored ardently to solve this question of coagulation. Yet it did not seem to have been definitely settled. Were the methods faulty? In the main, they do seem to have been, yet the results are varying. It is true they were not conducted in the same manner or under similar conditions, and this may have more or less influenced the results. He thought that experiments, to be exact, should be made under exactly similar conditions, and all from the same solutions. While the results of Dr. York seemed convincing, it was a question whether the results would be identical if the experiments were made in the teeth in the mouth, for the physical condition of a tooth in the mouth must be different from conditions found in an extracted tooth. He thought the whole question might be settled, as many others are, by united effort. Let those who have experimented along this line, with the addition of one or two independent investigators if thought best, adopt certain lines and methods of investigation, and each perform the experiments; then compare results. Investigations, to be exact, should be performed in the mouth if possible, then the teeth extracted and examined or tested chemically to determine the exact extent of penetration of the coagulants. If this could be done it seems as though more definite knowledge regarding the action of coagulants would be obtained.

Dr. H. A. Smith, Cincinnati, said he understood Professor Taft to say that when the pulp was removed from the tooth, the life of the tooth was entirely destroyed.

Dr. Taft. It usually is.

Dr. Smith said that the word "usually" knocked his objection out. According to the teaching of the New York school of histology, there is a reticulum of living matter in the dentin that preserves the life of the tooth. He believed that the pulp should be preserved when it was possible, but Dr. Ingersoll says that with a matured tooth it does not make much difference. For himself, however, he believes with Heitzmann that the living reticulum is distributed widely through the tooth, and does preserve its life. He did not think the careful use of arsenious acid was dangerous,—the danger is from using too much. Dr. Hugenschmidt, of Paris, has mentioned a number of cases of alveolar abscess between the apex of the tooth and the neck. This, if true, proves that there must be connection between the tubuli of the teeth and the dead pulp, and we must recognize the fact that the fibrillæ of the teeth distribute nutriment in the tooth-substance.

He did not see any particular advantage in the use of asbestos as described, and thought cotton or other substances would do as well to carry the medicaments.

As to antiseptics, there are many in use by different dentists, all of which, or most of them, apparently answer their purpose satisfactorily. Some dentists depend on one only, and others have several favorites.

Dr. W. I. Jones, Nelsonville, thought it looked as if the whole system of dentistry was based upon the coagulation theory, but could not understand, if this was so, how it was that so many different antiseptic preparations would work successfully. He did not believe that tests made outside of the mouth had any bearing on practical results. We know that silver nitrate will make a coating on the dentin that will protect the tooth, but if this coating is burred off the tooth will be as sensitive as before. If we are to revise the practice of our profession in accordance with the results of these new investigations, it will be necessary that the investigators should be so thorough that their results will not be open to any doubt or uncertainty.

Dr. F. W. Sage, Cincinnati, said that neither the use of silver nitrate nor of asbestos was original, but the combination of the two was original. The silver nitrate has the objection that it discolors the tooth. He thought that the application of sodium chlorid or common salt would lessen this action, especially if cataphoresis was used to drive it into the tubules. This use of sodium chlorid has not, so far as he knows, been referred to by any one. It would be much better if the profession generally would have a uniform practice in the treatment of root-canals, for then when a case presented for treatment one would know what to expect to find at the apex of the root and what to do with it. We do know, however, that when we drill into a dead root for the purpose of placing a crown, we are liable to stir up a hornet's nest. This is because the spores or other effects of the former decomposition have not been fully removed, and when the drill lets air into these bacteria they are worked up and restored to a state of activity.

In a prize paper recently published it is shown that it is necessary to open up the tooth so thoroughly that every particle of septic matter shall be removed. If we can demonstrate that the use of silver nitrate will enable us to drill up into the root of a tooth without causing trouble, we shall have done a good service to the profession.

Dr. C. R. BUTLER, Cleveland. Suppose Dr. Sage or some one else should prescribe a method that would be accepted by this body; how many would use it in their practice? There are nearly as many modes of procedure as there are persons in practice, and the hope of uniformity is very distant. It would be a very good thing if such a recommendation could be followed, as it would leave less uncertainty about how a root had been treated, but as a rule we are so wedded to our own ways that we would not leave them.

In regard to the paper of Dr. Smith, it is a very concise review, with some little filling in, of the views of the men who have been accepted as authorities on the subjects of coagulants and the preparation of cavities and chambers of pulpless teeth. He was glad that so young a man had given us such a concise presentation of the whole subject, and we should accept this paper as a good basis for continued work in these lines of investigation. The results of the experiments made by different workers vary so much that their experiments must have been made under different conditions.

The idea that the clearing out of the pulp will end all trouble is like that of the surgeon who believes that to cut off a damaged limb would be the best way to treat the injury. Such radical surgery is not allowable if the limb can be saved; and so with the pulp of the tooth,—it is part of the organization, and should be preserved if possible.

Dr. J. TAFT, Cincinnati, said that his statement was that if the pulp was destroyed the life of the tooth was usually destroyed sooner or later, but he did not say that the tooth immediately became a dead tooth. Sometimes the life of the dentin continues for years, but often it is lost soon after the extermination of the pulp. Of course the tooth, though dead, may be, and often is, useful for years.

Dr. HENRY BARNES said that Dr. McLean used silver nitrate and the oil of cassia. In such cases the silver nitrate was not necessary; the oil of cassia alone is better. In posterior teeth and those with tortuous canals nothing is better than silver nitrate for rendering the canals of a dead tooth aseptic, but in the front teeth the discoloration which it causes is a fatal objection.

Dr. L. L. BARBER, Toledo, asked Dr. Bethel whether he did not consider the penetration of silver nitrate, used either with or without the electric current, to be due to the formation of new compounds with the contents of the tubules.

Dr. Bethel said when silver nitrate comes in contact with albumin in the tissues they unite to form albuminate of silver, the composition of which is not definitely known. When silver nitrate is used in connection with the electric current, there is probably an electrolytic action that resolves the nitrate into its elements, which reunite in the tissues, and we get the silver oxid formation.

Dr. H. E. Dunn, Warren, thought it very necessary to use dehydrating apparatus to dry the root before other treatment; he recommended Evans's "root-drier" for the purpose.

Dr. McLean said he had had but about ten years of practice, and was not skillful enough to cap an exposed pulp and preserve it. He usually removed it with the use of the ethyl chlorid spray. He believed that the more dentin is removed from the root-canal the better, as there is less septic material remaining; and when filled there is more probability of preserving the tooth. He did not think pulps could be removed as well by cocain as by ethyl chlorid, as the latter anesthetizes the pulp so thoroughly that there is no pain.

As to the variations in pulps and in the direction and construction of the canals, there are no two teeth alike, and we have to use our intelligence to recognize the actual conditions. He did not believe in the use of acids, as their action cannot be limited; the silver nitrate is self-limiting. The reason that asbestos is better for filling root-canals than other material is because the powder is so fine that we can get it to any point where a broach can be made to enter. Some one said that it was not necessary to place the rubber-dam in position when about to remove the pulp. In reply to this it is enough to say that it is impossible to find an aseptic mouth; not to place the rubber-dam will be to invite the entrance of septic matter into the canals, and would be an inexcusable act of carelessness on the part of the operator. As to the various modes of treatment, he did not care for the experience of others; what he wanted to know was what he could best do himself for the benefit of his patients.

Dr. H. T. Smith, in closing the discussion, said that when the subject of treatment of root-canals was up for discussion before a local society in Cincinnati it had been decided that the canals were generally over-treated, and that when there was after-trouble it was generally because of the condition of the tissues beyond the root-canal.

The subject was passed, and Dr. W. D. Snyder, of Sidney, read the following paper:

I wish to say that I was not invited to read a paper before this convention, but was informed by the committee that I was expected to do so, and as a member of this honorable body I felt it my duty to make an effort. This, coupled with the fact that the subject with which I shall try to deal has always been of great interest to me, is my excuse for occupying a few minutes of your valuable time. The committee did me the kindness, however, to allow me to give the title to my paper, which, as you see by the program, is "That Troublesome Nerve," but if allowed to amend by adding "or Painless Dentistry" it would perhaps be a more fitting designation for my few remarks.

The practice of dentistry has many perplexing questions, and is beset by many annoying criticisms. In the operating department there is no one thing that causes more worry, or tends to make prematurely gray those once raven locks, than that little anatomical mass of odontoblasts, blood-vessels, white and gray matter, commonly known as the "nerve of the tooth." It has been a theme for study for ages past by odontologists, histologists, and pathologists, college professor and student. It seems to be uppermost in the mind of the patient as she sits in the operating chair. It is talked of in the home, at the club, and on the street; in fact, while it cannot strictly be said to be a figure in the public eye, it evidently is very much in the public mouth. It has many peculiarities and queer idiosyncrasies. Its lesions are many, and often difficult of diagnosis and uncertain of prognosis. Those lesions may arise from scores of different causes and the symptoms remain about the same. Just when we make up our mind that a pulp is so protected that it will certainly live, it will surprise us by passing suddenly into the great unknown. And after we have spent days and even weeks in trying to destroy its frail existence we find it still very much alive, and we may quote, "How many now are dead to me that live to others yet," etc. Different from most things according to the laws of nature, death does not always end the trouble with this little disturber of the household peace and professional friendship, but goes right on until it is wiped out of existence, literally torn from its habitation, its house thoroughly cleansed and disinfected, and a new tenant moves in that will be more compatible with the surrounding tissue. In dealing with a dead pulp it often requires more skill and better judgment than with one in its normal condition, for very often we find the mere opening of a pulp-chamber containing a decomposed pulp results in peridental inflammation and perhaps abscess. Nerve broaches here, either smooth or barbed, should be used with great care, even though the apex be not penetrated by the broach; too much cotton wound upon it might act as a piston, thus forcing enough septic matter or driving enough of the gases beyond the apex to irritate the surrounding parts sufficiently to bring about very bad results. I somewhat question the use of hydrogen peroxid or pyrozone in such cases, especially if left plugged too tightly in the cavity; a more mild dressing of some good antiseptic would be preferable. Again, such cases are not always treated a sufficient length of time, and the roots are filled in a partially septic condition, with equally unfavorable results.

There has been a great deal said and much written regarding the filling of root-canals. There are certain rules that must be observed, after which almost any material or method may be employed with a reasonable assurance of success. I have already alluded to the necessity of putting the tooth or root in the very best possible condition. The root-filling should be non-irritating, and one that can be inserted easily and perfectly to the apex. A very valuable quality for a root-filling to possess is ease of removal, in case of pain or inflammation requiring it. I remember reading an article not long since wherein the writer rather criticised the use of any antiseptic agent in a root-filling, claiming that such properties would sooner or later pass away, thus leaving the root in no better condition than though it had not been inserted. I am of the opinion that the use of an antiseptic in a root is of great value in most cases until after the parts about the apex, where the pulp has been dissected or torn away, have returned to their normal condition. Then it makes no particular difference if these properties do disappear, so the filling of the root remains. My method of filling root-canals is with common lime, mixed with water to a pasty condition, with enough carbolic acid and iodoform well mixed with it to give it as much antiseptic and disinfecting qualities as possible. I have used this method for over three years, and find it very satisfactory. As root-canal treatment and filling is not the subject of this paper altogether, we will pass to other conditions of "that troublesome nerve" that may have a claim upon some of our time.

There is no operation in which error can more easily be made than in filling over a live pulp. There are always two points to be attained,—viz, a good, substantial filling, for that is what is expected of us,—and one which will not only guard the pulp against irritation, but will of itself be non-irritating. To be able to excavate and fill a cavity without pain is very desirable, but within a fortnight to have that tooth begin to throb and jump is somewhat embarrassing, and results in a step backward in our very much desired popular dental education regarding the care of the teeth. No cavity, however small, should be filled without first having a coat of some good resinous varnish or non-conducting tooth-lining. Capping an exposed or a wounded pulp is attended with doubtful results, however practiced. We have no evidence that a wounded pulp possesses recuperating or healing power to any available degree, therefore we should be very careful in our operations, lest in trying to avoid giving our patient pain we throw open the gates to predisposing causes and let in the very object we would shut out.

It is not the purpose of this paper to dwell at length upon the details of every-day scenes or to enlarge upon relations we as dentists bear to the public, nor are we prepared to give to the profession a panacea for all the ills of this troublesome nerve, but we are here to offer what we have gleaned from observation and experience, and to open for discussion a subject, though it be old, that should be of great interest to us all. The writer thinks he has good reason to believe that some conditions connected with operations involving this troublesome member might be bettered; that popular dental education could be further advanced, and the dread of the dental chair and unfriendly criticisms largely diminished if more thought and more care were given to such operations.

Gold cap-crowns or large pieces of bridge-work are often placed upon stubs or badly decayed teeth with portions of pulp-tissue remaining that should be removed; pivot teeth are often set upon roots from which all the pulp has not been removed, or, if so, the root has not been put in the best possible condition. What is the result? Inflammation, pain, swelling, abscess, and a tirade of abuse heaped upon dentists and dentistry in general. There is only one way out of this trouble,—cataphoric appliances, arsenious acids, nerve broaches, cotton, and medicaments of all kinds, good and bad, are on the market plenty and cheap. Select the instruments and medicine with which you succeed best, and work intelligently.

Is this an age of painless dentistry? I think not. Yet I am glad to note the fact that a great effort is making in that direction. That dentistry is progressing there can be no doubt. Methods, means, and medicaments of no small value are each year brought out that redound to the benefit of both the public and the profession. The teachings of our colleges seem to be keeping pace with the times. The terms have in most cases been lengthened, the number of terms increased, and the faculty groomed and coached until they seem to be almost bubbling over with knowledge. Our dental literature, of which there is a fair supply, is teeming with good things. The signs then certainly point to the time when our fair patients will enter our sanctum arrayed in smiles instead of frowns, and depart with nods and bows instead of groans and tears.

Unfortunately, this dreamed of time has not yet arrived, but we may approximate as nearly as possible that golden age by using to the best advantage methods and means within our grasp.

### *Afternoon Session.*

The convention was called to order at 2 P.M.; Dr. Custer in the chair. After transacting some routine business, the discussion of Dr. Snyder's paper was taken up.

Dr. HUNTER said he understood that the general trend of the papers this morning was upon the same subject. The paper dealt in facts which confront us, and it is the dealing in these facts which makes us a profession. He read a letter from Dr. Wright in which he said, "If it were not for 'that troublesome nerve' the profession would not have entered the domain of pathology, anatomy, or histology. It is the wire that points us to the living organism, and makes it possible and desirable for us to study it closely. I am sure your paper will contain facts of importance and theories for correct practice, and regret that I cannot be with you to open the discussion."

Dr. W. T. BORN, Kenton, had concluded that there were many things he did not know, and how to cap a pulp successfully was one of them. He prefers to devitalize; it is more safe.

Dr. H. L. AMBLER, Cleveland, said that the question, "Was it alive or dead?" put him in mind of the joke the Irishman got off. He said, "If he could breathe without his breath he would not be dead," and if the tooth could live after the pulp was gone it was not dead. The idea that seemed to be expressed this morning was that the aim of the silver nitrate application was to stop off the canal at the root of the apex of the root, but the truth is it coats the whole canal. One gentleman spoke of using one to two grains of arsenious acid for devitalizing the pulp. The truth is one-fiftieth of a grain is as much as should have been used, and it should never be used in deciduous teeth. The acme of methods of treating pulps and canal is the nitrate of silver treatment.

Dr. H. E. DUNN, Warren, said there seemed to be uncertainty as to the action of arsenious acid on the teeth. How does it act; by limited escharotic effect? He had heard said it produces a strangulation at the apex. The fact that a portion of the pulp remains alive proves that it is by escharotic action; it does not penetrate far, and, if so, it cannot be hurtful in temporary teeth.

Dr. GRANT MOLYNEAUX, Cincinnati, asked whether there was not albumin in the substance of the dentin; we have lime, the inert matter, and the organic matter. The combination of silver nitrate with albumin will produce albuminate of silver if it stands only a few hours. If the deposit is of albuminate of silver, we do not understand its action.

Dr. J. S. CASSIDY, Covington, said that in case silver nitrate comes in contact with albumin there would be formed albuminate of silver, the combination of which with the moisture in the tooth would produce oxid of silver, which is what darkens the teeth.

Dr. MOLYNEAUX said that was just what he wanted to bring out; and now the question was whether the albuminate of silver would give us the result that we expect from silver nitrate.

Dr. DUNN said that a gentleman this morning suggested the use of sodium chlorid after silver nitrate; this would produce silver chlorid, which would not darken the tooth.

Dr. W. A. PRICE said, Not one-thousandth part of the silver put in the tooth under electrolysis remains silver nitrate. Oxygen goes toward the positive pole, and meets silver as it goes in. As silver nitrate under cataphoresis it will not form a deposit against the wall of the tooth, unless just at that point it should meet the other atom, which would be oxygen.

Dr. AMBLER said, In the use of silver nitrate we try to make a deposit the whole length of the root-canal. If you use silver nitrate and know it is a good thing, then why do you use sodium chlorid to destroy that which you have already done?

Dr. SNYDER said that the subject of root treatment had been pretty well discussed, and he regretted that he had forgotten in his paper to mention anything in regard to silver nitrate, but had rather generalized the treatment of the pulp, wishing to make a thrust at careless operators and manipulators. We all try for painless dentistry, but in working out our pet theories we fail to accomplish the desired end. When, for instance, the dentist puts a gold crown on the tooth and leaves a live pulp under a thin layer of dentin, we all know what the result is likely to be. The crown must be removed and the work done that should have been done at first. He was not anxious to be considered a pulp-killer, but we should all look to the probability of the future. He used arsenious acid. Every operation depends upon two things, proper instruments and proper use. Arsenious acid in his hands works well, but in other hands it might not work so well. Carbolic acid in treatment of pulp-canals is good. Whatever the action of silver nitrate should be, it had been a failure in his hands. He finds that the walls of the root-canals near the apex are nearly as sensitive after the use of arsenic as if the pulp were alive. Theories are numerous,—not all are bad. We do not want to treat teeth allopathically or homeopathically, but rather eclectically.

The subject was passed, and Dr. W. S. Locke read the following paper:

## Physical Changes that take place in Tissue under Pressure.

In this paper it is not my intention to present to you a method of regulating, but if possible some ideas as to the application of force, the effect produced on the tissues of the mouth during regulating, and why we so often fail in our efforts to correct an irregularity.

We hear or read papers written by members of our profession introducing some method or appliances, showing illustrations and models of cases successfully carried through, and the paper will be so beautifully written that the practitioner who has not had experience in this line is led to believe that it is very simple and needs no study whatever. These papers are usually written by men who are well advanced in this branch, and they give you their advanced ideas, little thinking that but few dentists have any understanding as to the first principles of orthodontia.

It is no wonder, then, that we have so many failures, when cases are undertaken by operators who go blundering along, not knowing why they do this or that; not knowing the physiological changes that are taking place in the surrounding tissue, the amount of resistance and force necessary to move a certain tooth, the distance it can be moved with safety within a given time, and last, but not least, they have no idea as to the position the teeth will occupy, or the facial expression of their patient when the case shall be completed.

Before we place a gold filling in a tooth, we have in our mind's eye the operation about as it is to be made. We know the amount of anchorage necessary to retain it in position, and we also know very nearly what the appearance of said filling will be. Now, why is it not possible to see into the future of a regulating case, as we do into the future of a gold filling operation? It is possible, but not without a knowledge of the subject at least the equal of that we have of other branches of the profession. With the proper knowledge it is now possible to correct almost any deformity.

It is supposed that in ancient times irregular teeth were less frequently found than at the present day. The supposed cause is that the ancient races were more uniform in size than those of to-day, and that the intermarriages of the different races of people, having widely different characteristics, were less frequent than now. It sometimes happens that one parent possesses a large frame with big jaws and teeth, and the other a small frame with correspondingly small jaws and teeth.

The offspring may inherit the small jaws of one parent and the large teeth of the other, the result being a dental irregularity. Sometimes the large jaws of one parent and the small teeth of the other will cause abnormal interstitial spaces between the teeth of the offspring. Now, if it is a fact that these abnormalities are becoming more frequent as time rolls on, it is necessary that our profession be abreast with the times and be able to prevent or correct such cases.

It is first necessary that we shall be familiar with the eruption and calcification of all the deciduous and permanent teeth; and in the young child many cases of irregularity can be modified or entirely prevented by the necessary treatment before all the teeth are erupted.

When mechanical force is necessary, the most important feature, in order to be successful, is to know the physical changes that take place in tissues under pressure, and the cause of such changes.

When in the act of regulating, pressure is put upon a tooth to move it, the first effect produced is compression of the pericemental membrane on the advancing side of the tooth and a stretching of it on the other. In this compression of the membrane the blood-supply is shut off, and the pulps become irritated. The irritation causes the development of cells known as osteoclasts, the function of which is to break down and absorb that irritated tissue. On the opposite side of the tooth quite the reverse is taking place; instead of compression there is tension on the membrane. The osteoblasts have been developed for the formation of new alveolar process to close the space left by the tooth.

When a case is presented for correction, and after good impressions are taken, it is well to measure and learn the amount of space occupied by the irregular teeth, the amount of space left in the arch, if any, and the room they will need in their new positions. This can be done, and very accurately. We will take one of the most common of all cases,—the eruption of a cuspid outside of the upper arch, with a little space underlying it between the lateral incisor and first bicuspid; the lateral incisor inside of the bite, with space between central incisor and cuspid, but not sufficient to allow it in the proper position. Measure the width of cuspid and lateral; add to that width about one-fiftieth of an inch (I might call it elbow room) for these teeth and each of the adjoining teeth, for it is impossible to leave them in the same crowded condition in which they were before the case was undertaken. The difference between that width and the space underlying the cuspid, and between cuspid and central, will be the amount of space necessary to provide for.

When force is applied to move a tooth, it should at first be light, as the exact amount of resistance it may give is unknown, and increased a little at each sitting, until the tooth is moving at the desired rate. Should the force be too sudden and strong, there is great danger of setting up an irritation which would cause the breaking down of all the tissue surrounding the tooth, even on the side from which advancement has taken place, as the rate of absorption of process is far greater than that of its formation; besides, the absorption is more rapid at the neck of the tooth, where the pressure is the greatest, and tilting will be the result, which is also likely to cause strangulation and death of the pulp. Again, when force is applied too suddenly, it may move or make very sore the teeth used for anchorage.

In applying force it seems best, when possible, to use the method that will give both positive and intermittent force, for when positive force is used and skillfully applied there is no doubt about the distance or the way the tooth or teeth will move; and when intermittent, is productive of but little pain, no irritation, except at the point of pressure, and it allows the immediate rebuilding of the bone and other tissue in the space just vacated. When constant force is used I find the rebuilding of the tissues far in arrears of the moving tooth, and it will become very loose and extremely sensitive to the touch. No attempts should be made to exert force other than in a direct line. You can not shoot around a hay-stack, even if your gun barrel is bent, nor can you successfully push a tooth in a curved line with but one direction of force. Care should also be taken that the point of resistance from which we exert pressure, and the points of resistance and delivery of force, are fixed points, which means that rubber bands or appliances of any kind should not be used in such a way as to shift their positions and in that way change the direction of force.

In the early part of August, 1896, the writer was called in consultation with a dentist who had attempted to regulate the teeth of a young lady by the use of rubber bands. The case was an anterior protrusion of both the superior and inferior maxillaries.

The two first bicuspids of the superior maxilla had been extracted and heavy bands drawn around the first molars on each side and over the cuspid teeth, hoping to draw the cuspids back in that way.

The patient was given an appointment and dismissed; she suffered great pain until the day for her return, which was nearly a week, without removing the bands. At this time it was found that the rubber bands had slipped far up under the gums, almost extracting both molars, and drawing them, together with the second bicuspids, forward, closing the space left by the first bicuspids; great irritation had been set up, and all the surrounding tissue was fast absorbing; about half of the palatal roots of both molars were exposed, and the bite separated at least one-quarter of an inch between the incisors.

It was thought best to give the case rest for a few days, that the inflammation might recede, and then push the molars and bicuspids back to their normal positions. This the dentist accomplished in about one month, at which time the patient was put entirely in my hands. Had his appliances been firmly and properly applied, this trouble would never have happened. On September 2 I took charge, and completed the case December 22 of the same year, reducing both maxillaries as well as drawing the teeth backward into the proper position. The results of the rubber bands are still to be seen in the mouth and on the models. While on this subject of rubber bands, a little method I use when I find it necessary to apply them, for retaining them to the crowns of teeth, keeping them from slipping either up or down, is to tie a ligature around the neck of the tooth, place the rubber bands in position, carry the ends of the ligature through the fissure of the crown, and tie them tightly to the ligature on the other side of the tooth.

In the positive method there are also many appliances in use that do more harm than good.

In one of our books of reference there is a drawing shown where a first molar and second bicuspid are banded with tube soldered to the buccal side of bands extending from the distal side of the molar past the mesial side of the bicuspid. Through this tube is run a threaded shaft to a cuspid tooth which is leaning forward. The intention is to draw the cuspid to the place of the first bicuspid, and at the same time to force it into the socket. From my point of view this appliance will not accomplish what is claimed for it, and, in fact, will in most cases do that which is least desired. Instead of forcing the cuspid into the socket the cuspid will pry on the bicuspid and molar, tilt them, and draw their mesial surfaces from their sockets.

Now, if the bands be soldered together and an eyelet be placed near the necks of the anchorage teeth, with the draw-bar attached so that it will be movable, and to an eyelet at the end of the cusp of the cuspid tooth, the force will be exerted the same on the cuspid, but only in one direction on the bicuspid and molar without prying them outward. There is in the same work another drawing where two laterals are being forced apart in the same manner. I tried this method several times, each with bad results, and the last time opened the bite to such an extent that the teeth had to be ground to bring the occlusion to the proper place.

A moving tooth will not always go in the exact direction intended, and it is best not to fasten too solidly to the anchorage teeth, for the tooth being moved usually holds the lever and is liable to do some damage.

If a cuspid is standing at the right angle and you wish to move it bodily, solder the tube to the cuspid anchorage and allow the anchorage teeth to hold the free end of the bar or the lever, as it were; the tooth will then be drawn bodily into position, and cannot possibly rotate, tilt, or injure the teeth from which power is exerted.

It does not seem advisable to require a molar and bicuspid to withstand the resistance of a cuspid, for, while it will often accomplish what is desired, it is likely to draw them from their proper positions; and while they will usually return, if allowed to do so at once they will not be fit for anchorage for many months; while if a second molar is attached, or an appliance made that will utilize other teeth to assist, there will be no trouble. Place appliances on the labial side of teeth when possible, unless they are directed across the mouth, as the inner wall of the alveolus is much more dense and will resist a greater strain than the outer wall.

In drawing a cuspid backward, it seems best not to attempt to force it too hard against the inner wall until nearly back to the desired position, for the resistance is greater when against this wall, and it forces the anchorage teeth outward toward the outer and weaker one. When the appliance is placed on the outside the force is exerted in the opposite direction, throwing the anchorage teeth against the inner and more solid wall, and the cuspid against the outer one, or directly backward; besides, the appliance is out of the way of the tongue.

In placing regulating appliances in the mouth, I have found it an excellent idea when bands are placed on the teeth to be moved to set them in chloro-percha instead of cement; the bands can then be warmed and slipped off at any time to make changes or to adjust the retaining appliances without any pain to the patient; and when bands are used around them for retention they are fitted so that they will slip in position before regulating, taking the impressions and soldering after regulating.

This is alluded to because all who have regulated teeth know how very painful it is to remove cemented bands or to fit retaining appliances after the teeth have been removed.

Since the publication of the paper on orthopedia, written by Dr. Case for the World's Columbian Dental Congress, the attention of the profession has been distracted from the mere moving of teeth to, it might be said, deformities of the face. I have given this subject some study, and it is astonishing what results can be obtained. Not only have I seen results obtained by others, but I have had the satisfaction of correcting some cases of deformities, changing and improving the features of the face to the perfect satisfaction of all concerned. In one case especially, the superior and inferior maxillæ were reduced, making quite a pleasant looking face out of one which had appeared both homely and repulsive. In the discussion following the paper read by Dr. Case, the question came up as to whether or not the bone was actually moved or the roots of the teeth moved, breaking down the tissue in front and building it up in the space left by the roots. At that time opinions were greatly divided. The few cases handled by the writer have been watched very carefully to note the changes which took place during the operations, and from what was observed I have come to these conclusions: When teeth are being moved forward, and all are moving at the same time by exactly the same pressure, the outer wall of the process is carried bodily forward, there being no irritation whatever except at the lingual cervical border, showing that a division of the process is taking place at that point, the inner wall remaining in its original position, the space being filled with new tissue, leaving this wall much thicker than before. If the teeth are carried forward one at a time, the process is then absorbed and replaced by new tissue. In retracting the teeth, where all are carried together the outer wall is carried with them, while the inner wall is absorbed because of the resistance behind it. Should they be carried backward one at a time, the outer wall of this process will not be carried with the teeth, but the new growth of bone will follow each tooth, leaving the process somewhat thicker.

When force is applied to the cutting-edge, say of a central incisor, and drawn inward, the fulcrum is at the neck of the tooth, and while the crown moves in the root moves outward to some extent; but where the crown is pushed outward the apex of the root usually remains stationary, and the tooth moves in. In a large proportion of those deformities which appear to be due to the protrusion or recession of the lower jaw it will be found, after careful study of the face, that the chin is in its proper relative position to the malar prominences and the upper part of the nose, and that the deformity is due to an imperfect position of the superior maxillary bone. We cannot be too careful, in the examining of these cases, to observe just where the deformities lie.

Some months ago a lady presented herself to have some operating done, and a great depression of the upper lip was observed. The deformity was spoken of, and she informed me that she had her teeth regulated about a year before that time, and that before regulating the cutting-edges of the upper teeth closed just inside the lowers. On examining the mouth, it was found that both lower first bicuspids had been extracted and the lower centrals were drawn back, or rather tilted backward, under the bite of the upper teeth, leaving a deformity as bad no doubt as before regulating. The lady stated that no impressions had been taken before or after the operation, and that the teeth were extracted and the regulating appliances (which consisted of rubber bands about the teeth) were placed in position within a few minutes after she presented herself for treatment.

Now this goes to show that the mouth was not carefully examined, much less studied, and that no effort whatever was made to better the facial expression; but the object was only to make the teeth occlude in the normal way.

Too much credit cannot be given such men as Drs. Angle, Case, Jackson, and others, who have worked hard to build up this specialty and obtain the confidence of patients, while many others are unintentionally and unconsciously working to break it down.

### *Discussion.*

Dr. H. A. Smith, Cincinnati, in opening the discussion, said that in the first place he would take exception to the title of the paper. The changes which were treated of did not come under the head of physics. There is a tendency at present toward correct nomenclature. It is very desirable to call things by their right names, so we can know what is meant. Physics pertains to material things. It is the science of principles obtaining in inorganic nature. In dentistry we are not dealing with inorganic nature, and so the term is misused. Before the rise of modern science physics was made to include vital science, but more recently it is confined to inorganic matter. The writer should have called the paper, "The Physiological Action of Living Tissues under Pressure." The line dividing the physiological and pathological is very narrow. To produce any change in a living tissue we must produce irritation, and then we have hyperemia, which is pathological. The author says in a certain case the blood-supply is excluded. If this is so, the change would not be physiological; it would be death of the part. Then, to follow the point, the cells which he calls osteoclasts would show the effect of pathologic condition.

Another friendly criticism would be toward his misapprehension of the word absorb. He should say resorb. Absorb means to draw in, or suck up as by a sponge, or to take something in which is foreign. Resorb, on the other hand, means to take back; so, in vital action, to resorb is to take back again into the system. These differences in the meaning of words are important, as the careful use of words is always important when discussing scientific subjects. The tissue originally given out by the pericemental membrane is taken back; that is, resorbed. Dr. Goddard, of San Francisco, in "The American System of Dentistry," says, "I think resorb expresses the idea more correctly. I presume we can say correctly that the deciduous teeth are absorbed." Herbert Spencer says, "The temporary organs serve their purpose for a while and then are resorbed."

Many men are doing excellent work on orthodontia, and while things go all right it does not make much difference whether they know much about the action of the tissues under treatment or not; but when anything goes wrong then the necessity for a deeper knowledge becomes at once apparent.

There is much said in the paper in regard to continuous pressure and intermittent pressure. He had been, so to speak, brought up on continuous pressure by the means of rubber bands, but in careful hands good results are obtained by both methods. The law laid down by Dr. Farrar was, "If you move a tooth a fraction of an inch at nine o'clock and a fraction of an inch at six o'clock, you will not have irritation." Well, if you don't have irritation you won't have resorption.

The amount of resistance at the anchorage must be greater than the force necessary to move the teeth that are to be moved, but need not be much greater, and teeth should not be banded unnecessarily. Dr. Black says, "My conclusion is that it is the resistance of the peridental membrane that settles the amount of force necessary to move a tooth. When we make no progress in moving a tooth, the reason is that the peridental membrane has so much power of resistance that there is no irritation and no absorption of tissue." If some persons can bite with a power of one hundred and eighty pounds and others with only eighty pounds, this fact may explain why in some cases there is less effect produced by the same pressure in the effort at regulation than in other cases.

The subject was passed.

(To be continued.)

# ANNUAL CONVENTION OF THE SIXTH, SEVENTH, AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

(Continued from page 227.)

## SECOND DAY—*Morning Session.*

DR. G. H. THOMPSON, of Honeoye Falls, read the following paper:

### ALVEOLAR PYORRHEA.

I will refer briefly to the etiology and treatment of alveolar pyorrhea. In no disease of the oral cavity has the scientific research of the past few years produced more beneficial results. It is but a short time since all cases of loosened teeth with a discharge of pus from the gingival border were grouped under one class and considered due to local causes. Now we look farther, and endeavor to trace to their fountain-head the various symptoms presenting themselves. In some cases this is a comparatively easy matter; in others it requires the most painstaking and exhaustive examinations.

We find two distinct forms of the disease: the one local, taking its origin in the saliva, the other systemic, due to some constitutional derangement.

In the first form we find the exciting cause in a deposition of calcium phosphate and carbonate around the gingival border. This deposition gradually accumulates and infiltrates itself into the gum-tissue and pericemental membrane, causing inflammation and subsequent discharge of pus. Our treatment of this form consists in, first, the thorough removal of all deposits. To accomplish this we should employ suitable instruments, both for the hand and the engine, and taking one tooth at a time proceed carefully, avoiding the laceration of the surrounding tissues as much as possible. By passing trichloracetic acid on a piece of orange wood around the deposits, they may be removed much more readily. Where we find pus exuding the pocket should be washed with pyrozone, and then packed with cotton saturated with a suitable antiseptic, and for this purpose listerine acts very well. The patient should be given a mouth-wash for home use, and instructed as to its use.

In the second form we find the symptoms of an entirely different character. Here we find local treatment by the dentist unavailing, unless coupled with an intelligent systemic treatment. In this form of pyorrhea we find the deposits upon the apical portion of the tooth. To distinguish the trouble in this case is sometimes very difficult, and for this reason our diagnosis should be performed with great care. Urinary examinations should be made and oftentimes repeated.

We find from the experiments made under the direction of Dr. C. N. Peirce that the deposits consist of calcic urate, sodic urate, with some calcic phosphate and carbonate; uric acid is the predominating element of the urates, and its existence shows that it is a precipitate from the blood exudation. We find that the tissues most liable to receive this exudation are the connective tissues, on account of their density and non-vascularity. It is easy to be seen why the pericemental membrane, composed largely of connective tissue, should become the seat of these deposits. The deposits are found upon teeth where there is a faulty articulation, or a tooth in which the pulp has died, and by this means set up an inflammation of the surrounding tissues.

We find two classes of patients suffering from an excess of uric acid in the system. In the one patient we find the excess due to an imperfect oxidation of food products, superinduced by high living and a lack of exercise. Then we find the anemic patient. Here the tissues have become so starved that the system is unable to throw them off in the regular way. In our treatment we should distinguish between these exciting causes. The systemic treatment of the one suffering from an overabundance of tissue-producing material would be quite different from the one where there was a lack of this material. In regard to diet, the first should be restricted to such an amount of nitrogenized food, whether animal or vegetable, as the system can satisfactorily dispose of, having at the same time due regard to nutrition and strength of body. Plenty of exercise is necessary in order that the system may be induced to use up the extra food products in a legitimate way. The second should have a fairly full and nutritious diet. All malt and stimulating liquors should be prohibited. Both classes should drink plenty of water. Alkaline salts, that will cause an elimination of the uric acid from the blood, should be advised. The bitartrate of lithia, introduced to the profession by Dr. E. C. Kirk, acts very happily in this respect. The digestive organs need attention, and for this purpose we should invoke the hearty cooperation of the physician, as no amount of lithia salts will cause an eradication of the trouble.

The local treatment by the dentist would be much the same as in the case where the disease was salivary in its origin. No matter how permanent we may think our treatment, the trouble may recur. We should warn our patients to return to us on the first reappearance of the symptoms.

### *Discussion.*

Dr. W. A. Barnes, Buffalo, asked if any dentist present claimed to cure pyorrhea.

Dr. C. S. Beck, Wilkes-Barre, felt diffident about speaking,—would prefer some older men to speak on the subject. He had never seen a case cured, and he had a case in his practice which he would like to show to some of those who cured all cases. He did not believe in the theories of some of the prominent members of the profession who taught that all cases could be successfully treated. He thought palliation of the condition was as much as any one could reasonably hope for. The use of lithia water, with care about the living, would do as much as any treatment. He once had a case in which thirty-two teeth were affected. He submitted it to Dr. Atkinson, who treated it by forcing aromatic sulfuric acid into the pockets for a month with no advantage at all. He then took the lady to Dr. Garretson, who advised deep incisions between the teeth. She submitted to one treatment of this kind, but would not submit to any more, it was so severe. As a final resource all the teeth were removed and artificial plates worn. He believed that to attempt to remove all the tartar would so injure the periosteum that it would never be restored.

Dr. L. S. GOBLE thought if those who implant teeth can get the result they claim, that it would be reasonable to expect the periosteum about a tooth from which the membrane had been removed in treating pyorrhea to be recovered. He thought that many made the mistake of undertaking too much at one time. If only one tooth was treated at a time and the gums stimulated by massage, it would be more hopeful. If the process of cleaning about the roots is pushed too fast, the sockets will be filled with blood, which will hinder the work. He believed in the good effect of dietetic treatment, and spoke of the benefit one of his patients received by abstaining from starchy foods. Out-of-door exercise, like bicycle riding, was also beneficial. It is too early to say the disease cannot be cured. If treated early, it can certainly be cured, though probably, if there is carelessness about the diet and lack of exercise and neglect of care of the teeth, the disease will return.

Dr. BARROWS did not believe the disease could be cured. He said it was a systemic disease finding local expression. The treatment should be both local and systemic. It is easy to remove the calcic deposit, but to remove the serumal deposit would endanger the membrane, which, if destroyed, will not be recovered. He spoke of the case of a lady who had been treated by a dentist in Boston, who told her she must return in a year. Long before the year expired the condition had returned as bad as ever, and she called on Dr. Barrows, who told her all that he could promise was temporary relief. This disease seems to be more frequent than formerly, and receives more attention than perhaps any other subject at dental meetings.

Dr. F. B. DARBY, Elmira, thought it pretty strong talk for a man to get up in a dental meeting and say pyorrhea could not be cured, when we all know what Dr. Riggs did for the disease. He cured his cases in one or two sittings. He knew of one case in which the mouth was in a horrible condition, but Dr. Riggs cured it in two prolonged sittings. As to destroying the periosteum, he did not believe the membrane was in a condition to be of any value where the deposits were.

Dr. J. W. COWAN, Geneseo, spoke of cases of the disease which were treated by his predecessor and cured; the disease had not returned in ten years. One of the cases he saw about four times every year, and was familiar with its condition. The patient is a lady, who is very careful of her teeth and drinks no water except lithia water. Other cases have the teeth treated frequently, and they remain in good condition.

Dr. J. W. HECHLER, Buffalo, asked if Dr. Barrows's objection was the fear of pulling the pericemental membrane loose. If this is a real danger, it proves the impossibility of successful implantation. He thought it safe and advisable to remove the deposit with proper instruments. The gum we will always find hypertrophied, but after the deposits are removed it will resume its natural bulk and color.

Dr. BECK admitted that pyorrhea could be cured when treated in its incipient stage, but after it had continued for some time he thought it impossible. He had seen one case that had been treated by Dr. Riggs, who charged two hundred and fifty dollars for his services, and it was a perfect failure. When we study the growth of a tooth we find that the alveolar substance grows with the tooth, and when the tooth is removed the alveolar structure disappears; so with the periosteum. If this is removed, it will not be restored. While the deposits remain mastication will always cause irritation, and the irritation will keep up the flow of pus.

Dr. H. B. HEWER, Williamsville, said when there is production of pus there must be infection, and to cure infection we must use antiseptic treatment. Those who treat the disease successfully make the patient wash the mouth frequently with antiseptic preparations. This treatment is becoming frequent in many diseases, such as fevers, to lessen the danger of infection.

The subject was passed, and the following paper was read by Dr. C. F. BENTLEY, of Niagara Falls:

## THE CARE OF ARMY TEETH.

There are employed by the United States Government in the regular army over twenty-eight thousand men; of this number there are one hundred and seventy-seven surgeons. The care of the teeth is as important to people in the military service as to outsiders. The facilities for such care are certainly not as good as they should be. At most posts soldiers would have to go to a great expense to reach a dentist, and lose time for the good in doing so, whereas if a dentist was doing the army work at the post this work could be done at the time most convenient to the patient without causing any loss of time or duty.

The proper care of the teeth would necessarily improve the general health of the army, and probably lessen the number of cases of discharges for disability. Of course this work should be intrusted to those persons only who have proved themselves first-class dentists, and they should receive a compensation and position commensurate with their professional attainments.

Aside from the extraction of teeth and the use of emergency gutta-percha fillings, almost nothing is done for the care of the teeth by the army surgeon. While the army medical corps embraces men who are competent in the practice of medicine and surgery, yet the practice of dentistry is so highly specialized, requiring not only a mechanical bent of mind but also a special training in operative work, that there is probably not one of that corps to-day professing a knowledge of dentistry.

For the past nine years I have done most of the work at Fort Niagara, and I find that the men are very careless about the care of their teeth, often seeking extraction, but usually having no funds for this purpose. If proper care of the teeth were taken, old soldiers who are desirable could be retained for a much longer time.

The army posts number about one hundred and twenty-five. Such posts as Leavenworth, Riley, West Point, Presidio, and Vancouver could occupy each the time of a dentist.

There are three methods by which the government could employ dentists: First, by commissioned corps; second, by contract corps; third, by contract with local dentists. The government employs surgeons, veterinary surgeons, and chaplains. Why not employ dentists?

I have embodied the foregoing suggestions in a resolution which I desire to present for your consideration:

WHEREAS, There is employed in the United States Regular Army a medical corps, an there are not connected therewith individuals regularly instructed in the practice of dentistry in its various and complete branches, and

WHEREAS, Dentistry is now an important, distinct, and necessary profession in itself and conducive to the individual welfare as much as any other branch of medicine or surgery, and is not regularly practiced by physicians and surgeons in its various and complete departments, so that it is therefore frequently impossible at present for men in army life to obtain necessary and proper dental treatment; therefore be it

*Resolved,* That we, the members of the Union Convention of the Sixth, Seventh, and Eighth District Dental Societies of the State of New York, recommend that said dental societies, through the representatives in Congress from their respective districts, submit to the military authorities of the United States the advantages to be derived from having attached to the various army posts regular practicing and competent dentists, and that said dental societies request their said representatives to take such steps as may be necessary to have effective measures taken by the proper military authorities to that end, and to procure necessary legislation therefor;

*Resolved,* That copies of these resolutions be sent to the secretaries of the various dental societies of the state of New York, and their co-operation requested in the movement hereby recommended.

### *Discussion.*

Dr. J. W. HECHLER, Buffalo, thought this resolution would be more fittingly brought before the state societies, rather than the district societies, thus getting action from a larger body.

Dr. H. J. BURKHART, Batavia, thought that the only way the passage of the resolution would be of real benefit would be by the effect its passage would have upon the action of Congressmen, and that their action would be more likely to be affected by the opinions of the district societies at this time than to wait until the state society's meeting.

Dr. R. H. HOFHEINZ, Rochester, said that when he was in Vienna he met Dr. Thomas, the well-known American dentist, who told him that he had influenced a number of men in Triest to open a clinic to treat the teeth of the men at the naval station, at that place, at a nominal cost. This was favorably received by the government, and Dr. Thomas had been asked to do something similar for the army. It was more necessary to have dentists appointed for the navy than for the soldiers, but desirable for both.

Several members spoke shortly in favor of the resolution, and it was carried by vote and the subject passed.

Dr. Frank B. Darby, Elmira, in behalf of the Sixth District Society, invited the Seventh and Eighth District Societies to meet next year with the Sixth District Society. He also announced that after next year this latter society would withdraw from the union meetings, as they considered it was more for the interest of the society to hold both semi-annual meetings in its own territory.

The invitation was accepted, and the convention adjourned till afternoon.

(To be continued.)

## FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

The First District Dental Society of the State of New York held a regular monthly meeting Tuesday evening, December 14, 1897, at the New York Academy of Medicine, No. 17 West Forty-third street; the president, Dr. Alfred R. Starr, in the chair.

### Incidents of Office Practice.

Dr. S. C. G. Watkins, Montclair, N. J. A few months since I reported before this society my experience in the use of ammonol for allaying pain in cases of pulpitis and periostitis. I now wish to make a further report of my experience in its use in similar cases up to this time. In nearly all such cases I am able to control the pain and comfort the patient. The following will, I think, illustrate its efficiency: A patient complained of soreness in the upper first molar, which had been crowned; she had been kept awake for several nights, and was unable to locate the pain positively; thought it was in the tooth which had the gold crown on. I administered fifteen grains of ammonol, and directed her to take ten grains each hour until she had taken three or four doses, unless the pain was relieved sooner. After taking three doses she was entirely relieved, and had a good night's sleep. About four o'clock in the afternoon of the next day the pain returned. I again administered ammonol in the same way, and as a result all pain ceased and the patient had a good night's sleep. The following day, toward evening, the pain returned; I then examined the case carefully, and discovered a large cavity in the posterior surface of the second bicuspid, with exposed pulp, which faced the gold cap. I applied a temporary dressing for two or three days, using ammonol as a sedative; I then capped the pulp and filled the tooth with oxyphosphate without pressure or causing any pain. Next day the toothache followed, and to quiet the pain I again resorted to ammonol, which acted just in the same way that it had previously, so that she lost no sleep and never suffered more than an hour or two at a time.

In this case I presume the pulp was congested and dying. I have described it for the purpose of showing how we can control pain, which has baffled us all in the past, with a simple remedy, and I hope others will use it as I have and be able to report similar good effects.

Another preparation is tribromphenol-bismuth, an antiseptic to take the place of iodoform. It is non-irritant and soothing in its action, and has none of the unpleasant odor of iodoform. I have used it in many cases with uniform success, and am quite confident that it will reduce inflammatory conditions in the treatment of pulpless teeth. I use it in conjunction with a liquid antiseptic. I have used trikresol, formalin, oil of cinnamon, and other liquid antiseptics with it by pumping it into the canal to its entire length. I rarely treat a tooth but once.

When the canal is filled with the tribromphenol-bismuth in pasty form the canal is filled with a rope of cotton, the cavity filled with gutta-percha, and allowed to remain for a week or two, or longer, until all inflammation has passed away and the tooth has recovered; it is then filled permanently at the next sitting without further treatment. Tribromphenol-bismuth seems to hold its strength; will not deteriorate or change. I have seen it for several months at a time in a canal, and when removed it seemed to be as sweet and pure as when placed in the cavity.

As a local anesthetic for the extracting of teeth, I have been using of late a new preparation of eucain called eucain B, which is superior to the ordinary eucain A,—it is stronger and less irritating. The toxicity of eucain B is much less than eucain A, and very much less than cocain.

With eucain A I use a seven per cent. solution, with eucain B not more than a four per cent., and it is said that a one or two per cent. would be sufficient. I would inject about a quarter of a syringeful on each side of each tooth, and then wait for a minute or two for anesthesia to take place before extracting. I have used it quite freely, and have not seen any bad effects from its use.

The president introduced B. BARRYMORE MARCO, D.D.S., who read a paper entitled "A System to Assist in the Identification of Criminals and Others by Means of the Teeth." (See DENTAL COSMOS, February, 1898.)

He was followed by DWIGHT L. HUBBARD, M.D., of New York, who read a paper, the subject of which was "Immediate and Remote Causes of the Malformation of the Dental Arch."*

### *Discussion.*

Dr. WM. CARR. You state that Dr. Garretson objects to early interference; what is your experience?

Dr. HUBBARD. Dr. Garretson refers to direct correction of irregularities of the teeth, except where there are mechanical obstructions such as I have named. I would interfere as early as possible to remove obstruction in the nose, naso-pharynx, and pharynx. I have operated as early as ten days on an infant with lymphoid obstruction who was actually starving from inability to nurse. I remove, generally, adenoid growths at from two to eight years.

Dr. CARR. When children are brought to me for dental operations I always examine for adenoids, and advise removal at once, referring to a specialist. I would like to ask Dr. Hubbard what the results are upon the muscles of expression.

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*For the paper in full, see page 270 of the current number.

Dr. HUBBARD. The expression in such cases is pathognomonic. I find that the muscles of expression rectify themselves after thorough operation. There are two or three cases which I have had under observation for eight or ten years. The conformation of face has radically changed, and health is decidedly better.

Dr. LOUIS C. LEROY. Appreciating the special work of Dr. Hubbard in this direction, am I correct in inferring that we, as dentists, may make a mistake in endeavoring to correct irregularities of the teeth by mechanical means, and that operative procedures in the line indicated should be the first in order?

Dr. S. C. G. WATKINS. I think it is wise in cases of mouth-breathing not to attempt regulating the teeth until that difficulty is first corrected. I have in mind the case of a boy who when quite young had a nice round arch, but later, through mouth-breathing, he became anemic and very much debilitated, and altogether in a very precarious condition, and acquired almost an idiotic expression. A specialist, Dr. Delavan, was consulted when he was in his ninth year, and an adenoid growth nearly as large as an egg was removed from the posterior nares. He improved immediately after the operation, and is now in his seventeenth year; is six feet two inches tall, and weighs one hundred and ninety-five pounds, a perfect type of physical strength and a bright boy. Although the deformity of the jaws, caused by mouth-breathing, has not been corrected, yet it might have been; but would have been impossible previous to the operation. His features are spoiled to a great extent, but he has teeth of good quality which require very little attention.

Dr. CHARLES G. PEASE. There is another deformity caused by mouth-breathing depending on lymphoid growths in the vault of the pharynx,—that produced by the elongation of the molars, preventing the occlusion of the anterior teeth. I have had several cases, one where only a portion of the second and third molars occluded, there being a large space between the upper and lower teeth anteriorly. The mouth being continually open in breathing, the molars are elongated in the attempt to obliterate the space caused by the open mouth; hence the deformity.

Dr. SIDNEY S. STOWELL, Pittsfield, Mass. This subject, as presented by Dr. Hubbard, is of deep interest to me. We as dentists have ample opportunity to observe malformations of the mouth, resultant upon interference with the air-passages. I would speak of my own personal experience in this connection. For many years one of my nasal passages was obstructed. Last winter Dr. G. Lenox Curtis removed several pieces of bone from my nose. I can now sleep with my mouth closed; I am able to breathe freely, and my condition is greatly improved, with increased chest development as a result.

Dr. HUBBARD. As far as I am able to see, the work of the dentist in regulating the teeth is exactly in harmony with that of the oral surgeon. In addition, I would emphasize the need for looking beyond it,—to early observation and suggestion for treatment of these conditions in children. A case in Tomes's "Dental Surgery," a child three years old, with a severe burn on the chin and a curvature of the lower jaw downward. No occlusion beyond the molars. This shows how a steady and long-continued force may distort these structures. Elongation of molars under these circumstances is direct proof of the theory advanced.

A deflection of the septum in nasal passages shows hypertrophy of the middle turbinated bone of the concave side. This is the attempt of nature to fill a void at the point of least resistance.

I have seen very happy results from minor operations, as in Dr. Stowell's case. The air furnished through the nasal cavity is ten times better than through the oral cavity. Catarrhal conditions certainly are factors in reducing nutrition.

On motion, a vote of thanks was extended to Drs. Marco and Hubbard for their valuable contributions.

Adjourned. B. C. NASH, *Secretary.*

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## NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, November 16, 1897, at the New York Academy of Medicine, 17 West Forty-third street, New York city; the president in the chair.

The minutes of the last meeting were read and approved.

### INCIDENTS OF OFFICE PRACTICE.

Dr. J. A. STEURER. During the past few months I have made great improvements in my plastic gold. There have been formerly some complaints that there was some crumbling and wasting. I have overcome that, so that now, although the gold has the same appearance, it works after annealing just like wax, and can be picked up with an instrument, and there is not the slightest crumbling of it. At the request of a large number of dentists I have also put it up in large sections, in order that they may cut it any shape they please. I formerly had it made up in small blocks in vials, and still do so, in addition to the new form. The main point that I wish to cover is that the fact you can pick it up shows that the interstices are not filled with a powdery precipitate, as in a great many forms of these golds, where they are close. The only one that is not so is the crystal gold, but we all know its merits and demerits, and what there is in it different from mine.

Dr. W. W. WALKER. Have you overcome the tendency to crumbling when you place the gold in the cavity and press against the walls?

Dr. STEURER. Yes, I have overcome that. You can push your instrument through it and it will not crumble. The same rules are applied in working it as in any form of gold. Some may think it looks a little coarse, but this shows that it is a perfect crystalline mass and not a powdery precipitate. The gold as formerly made

I was accustomed to anneal before placing it in the package, but this improved gold is so soft that I cannot anneal it, because it will all stick together, so I put it up without annealing, and the dentist can do that. There are certain points about annealing that I think I have overcome. I have been studying up the subject of a dental annealer, and it works very nicely with my gold. It is automatic, and used with an alcohol lamp. I have taken advantage of some physical laws, and it will tell you exactly when the gold is annealed enough. I am not, however, prepared to speak further on the subject, as I am still carrying on my experiments. Used with an ordinary alcohol lamp, you cannot burn the gold. It is a very simple apparatus and very inexpensive; there is nothing about it to get out of order,—no complicated features as in the electric annealers, and I think it will be a very good thing for practical use.

(Samples of the gold were passed around.)

Dr. A. R. STARR. Is this the average thickness of the gold?

Dr. STEURER. That is about the average thickness. You can spread it and make it as thin as you like before you condense it.

Dr. M. L. RHEIN. I have a couple of very interesting incidents of practice, but I want to preface with a word on the subject of the Mason crowns. We have been using since the year 1891 practically this crown (showing model), with the difference of the gold back on the porcelain instead of platinum, the gold gib having been riveted on straight-pin teeth. The idea is undoubtedly that of Dr. Van Woert, and he is undoubtedly under obligations to Dr. Wardwell for the initial idea. The matter has come up here, and I would like to have it go on record who should get the credit of this form of crown-work, which I myself believe to be the best method that can be used for either crown- or bridge-work. There is room for improvement in the Mason faces as they are turned out at present, and I offer that as a suggestion to Dr. Mason.

It has long been a subject of debate among us as to the possibility of deposits being found on the end of a root and the gingival border of the tooth not being involved. I have always been a firm believer in this being the initial cause of many of the worst cases of pyorrhea that come under our notice. The trouble starts directly at or very near the end of the root, and our great inability to treat these cases is due to the fact that we cannot reach the source of the trouble. It is difficult to find an extracted tooth just in this condition, because the process is of such a nature that when this deposit settles upon the end of the root we get at once such a degree of acidity that the root itself becomes absorbed, and when the tooth is lost the ends of the root have disappeared. I have a patient under treatment for pyorrhea who has been giving me a great deal of trouble. A number of the teeth I find to be pulpless. In investigating the condition of the roots I found that the operator who had originally attended to the teeth had made false openings between the two buccal roots of an upper molar, and there was such a condition of abscessed tissue between those roots that I decided it was better to remove the tooth, and to my astonishment I found such a specimen as I have been hunting for for ten years. The gum around the gingival border of this tooth was in a perfectly healthy condition. On the root we find that the pericementum has set up a barrier of defense against the irritation of the acid condition near the apex. This is shown by a slight exostosis. Above this the roots appear as though a carpenter's plane had encircled and smoothed them, so much of their surface having disappeared, and the acid deposit is found right over the tips of the roots. On one of the buccal roots this condition is found in a much more advanced stage, while the others show plain evidences of the same condition. I am very anxious to place this specimen on record, as we have heard a great deal of this condition, and here is an excellent example.

In the case of electrodes for cataphoresis, one of the best ideas that Dr. Morton gave us was what he termed brush electrodes. Since the summer I have made a number of these, and I find them of such great advantage over anything else for that purpose that I wish to pass them around.

This one that I have made is a brush of fine platinum wires, with a little ring that enables one to hold it tightly or to spread out the wires in any way that is desirable, according to the shape of the cavity. At the same time, the frame can be bent to any curve or put in any hole. By dividing this bunch of bristles into a smaller bunch, I can desensitize two approximal cavities at the same time. While we get that sometimes by simply placing our electrode between the teeth, as a rule it is a matter of chance which one will be affected. Here are a couple that I have attached direct to the end of the positive wire. They are a little smaller. This one can be held by the hand, and often fixed in such a way that it will hold itself in place. One of the great advantages that Dr. Morton pointed out was that the capillary attraction fills the space between the wires, so that we get a perfect reservoir of solution during the time of cataphoresis and the cavity never gets dry.

Dr. S. G. PERRY. Have you used the cataphoric apparatus some time, and have you been pleased with it, and what advantage arises from it? I ask the question because I hear quite a number of people who have it in use question its real value in actual practice. They seem to be somewhat disappointed.

Dr. RHEIN. I am as favorably impressed with the apparatus to-day as I have ever been. There are patients whom I work for in a satisfactory manner for whom I never could have worked without it. There are a very small percentage of cases that are difficult to cataphorize in this way, because I do not believe there is a case that it is impossible to anesthetize, unless there should be an absolutely idiopathic resistance to the action of cocain. I believe it is merely a question of time and patience in any case. I have not had a single case where any bad result has followed its use. I am referring now not to outside work, but to the inside of a tooth. I have not had a single result that could be termed injurious in any way.

Dr. STELLWAGEN. These remarks are made with a feeling that they should be accompanied with an apology for bringing such a simple matter before you, but that they may be excused on the plea that the time consumed in dental manipulation should be limited as much as possible. Some dentists fail to recognize that in operating upon a living human being, and particularly one who is of a sensitive or nervous nature, anything that will expedite the operation may be of advantage. Who has not repeatedly met patients who have had the so-called very finest work in their mouths, judged from the mechanical standpoint, yet have been broken down for years afterward, and refuse to re-enter a dentist's chair, because they had some of these magnificent gold fillings inserted by some ignoramus, which work exhausted the nervous energy and broke down their health?

It is a little strange to come from Philadelphia to New York, where Barnum first introduced the rubber-dam, and take exception to the indiscriminate manner in which the rubber-dam is being used to-day. Often a tooth can be properly filled in half the time taken to adjust that contrivance, and there are patients who will not and cannot permit its use in their mouths. In very nearly ninety per cent. of our operations a few pieces of ordinary unsized muslin, torn or cut into squares of about three inches, are vastly more useful. Properly managed in the mouth, these little absorbers will keep most of the cavities in the teeth perfectly dry. A number should be prepared and laid flat in a small drawer, ready for use. They are useful for a thousand-and-one things. Sometimes they are torn into narrow strips for polishing; sometimes cut into smaller sections for drying out cavities. If desirable, two or more can be folded together. Use a single one placed between the cheek and the tooth, and between the tongue and the tooth two or three may be needed to keep a cavity dry. Bleached muslin is preferable, for the reason that it does not take up the moisture quite as rapidly as linen. It was expected to have a clinic at which the manner of using these could be shown. It is easy to slip a dry one in next to the tooth, and pull the moist one out with a pair of pliers. If it is necessary to leave the patient for any particular reason, get him to take hold of the tooth with a forefinger and thumb, and often he can hold it dry for five or ten minutes. In cases where the saliva runs very freely you will find the saliva ejector useful, and you may have to use the rubber-dam. Armed with the squares, one need not apply the rubber-dam as often now in a month as formerly in a week, for this method answers nearly all purposes.

Here are toothpicks trimmed to about the size of an average pulp-canal. They are in a number of vials in which are the medicaments used for treatment of teeth. As needed they are taken out with pliers, used in the applications up the pulp-canals, and then are applied; after baking dry they will remove the moisture rapidly and thoroughly from a root-canal. Numbers may be used one after the other. It takes almost no time at all; it is done as quickly as one can tell how to do it. I would like to know what wood these Portuguese toothpicks are made of. It appears to be too fine in grain for orange. It is well to have half a dozen of these vials with the different drugs for applications, such as alcohol, solution of carbolic acid in alcohol, methyl salicylate, and camphor with carbolic acid, and the tapered wood, if kept soaked, is flexible and will pass into the curvatures of the roots of the teeth. While these do not entirely supersede the steel broach, it is well within bounds to say that in more than three-fourths of our cases these canal explorers answer the purposes as well as, and in many cases better than, the steel broach. If it is desired to use them very dry, the vials containing them may be stood up in vessels of boiling water or ovens, and kept there until the wooden points are thoroughly dry and sterilized. It is sometimes well to pass them over or through the flame of an alcohol lamp; char them a little, and they are all the better for removing the overpowering odor of putrefaction. Charcoal is one of the best practical absorbers of the offensive gas.

For devitalizing pulps in straight roots the pick should be trimmed down to the size of the canal. Enter the sharpened point on one side of the pulp. Very often it can be gently coaxed slowly up quite a distance before the patient complains. Hold the pick lightly between the fore and middle fingers, judge the length of the tooth-root, and with cutting pliers cut off the wood at that distance beyond the point where held. There is no pain to speak of from a quick blow of a wooden mallet or ruler that drives the wood up the canal to the apex, and no jar, because the fingers take that. Frequently teeth-pulps are killed and the canals filled to the ends of the roots permanently in less than ten minutes by this process. Allow the pick to remain in until the fluid of the pulp has soaked well into it and a little coagulum has formed; then on removal it brings out the main body of the pulp. Gently press up and draw out dry ones, repeating until they come out perfectly dry. The canal is now ready to have one introduced with medicament; let it remain long enough to reach every part. Finally, fill the pulp-canals with wax, and after making a little gold tapering point of non-cohesive gold foil rolled into the shape of the canal, heat and push it up, when by carrying the wax before it we make a hermetically sealed root-filling. Burnish the projecting end of the gold at the mouth of the pulp-canal, remove the surplus wax with a scoop, and the operation is completed, so far as the filling of the roots is concerned. Out of a great number I have had trouble only in one or two cases. The wax is soothing, harmless, and comforting. This use of wax is not original. We know that wax hermetically seals, and that the sealing lasts indefinitely. It is a fact that wax has been found in the nostrils of mummies thousands of years old, so that it undergoes no particular or practical change.

Dr. PERRY. How long have you had the wax in that form?

Dr. STELLWAGEN. A little over two, perhaps three, years. In one case in which trouble arose it was anticipated. The patient was in a hurry, and the canal was not really prepared. There was moisture within at the time I filled it. The patient came back after a little while and complained of pain. It was only a few moments' work to pull out the little gold taper plug piece, and relief followed immediately. The tooth was treated and filled again without after-trouble. I must confess my utter amazement at the simplicity of the thing and at the satisfaction that we have had with it. It has proven far superior to anything for a root-filling that I have ever tried.

Dr. PERRY. I am very favorably impressed with the idea of the wax, because I have always contended—and I think you will bear me out in that—that the filling, after all, must be one which can be easily removed from the canal. I have not used the wax in that form, but I think very well of it.

Dr. J. B. LITTIG. What form do you put the wax in to use it in that way?

Dr. STELLWAGEN. A roll of wax may be pushed in with a steel wire or a wooden toothpick, whichever happens to be handy, after it has been inserted as far as possible; then heat the gold with a little wax melted on it and carry home. The heated gold makes the wax very fluid, and while in that condition wax seems to be carried by capillary attraction to the very apex of the root, or as far as there is open space. It is doubtful if with any filling-material it is wise to remove all of the remains of the pulp in every case from the very apex of the root.

Dr. WILLIAM JARVIE. Does the professor prefer toothpicks to the paper points for drying out the root-canals? They seem to me to have much greater absorbent qualities than the wood. I have not tried the wood for that purpose.

Dr. STELLWAGEN. I prefer the wood for these two reasons: The paper points very often soften too much with the moisture, do not pass up the canals, and may break in drawing out; the wooden toothpick almost never does. Probably not one in a hundred breaks from this cause. The paper, although it is probably a better absorbent, is not so useful. The wooden points cost next to nothing, and are no trouble to keep in the best condition for their work. Sometimes with a warmed steel broach, by moving it back and forth in the canal, one can drive out moisture from parts nearer the apex than with an air syringe. After trial of a great many of these devices, it seems that these canal-dressers give the best results.

Dr. JARVIE. Last winter some one demonstrated a process for drying out and filling root-canals that to my mind was ideal,—drying by electricity. It was simply marvelous. It would not take more than a moment.

Dr. E. PALMER. That was a little instrument with a point soldered to it. You turn on the electricity and heat the root at the apex with a little wax or anything put in the root.

Dr. PERRY. Do you use it every day?

Dr. PALMER. I am still using it.

Dr. S. C. G. WATKINS. For the past few months I have been using a new antiseptic for root-canals, with marked success. The preparation is known as "Tribromphenol-Bismuth." It is similar to iodoform, and is used in the same manner, but it lacks the disagreeable odor. It is a very fine powder, so that it can be carried to the apex of the root by mixing it with some liquid preparation and pumping it in the canal with a broach wrapped with cotton. I use trikresol for that purpose, dipping the broach first in one, then in the other, and carry them to the end of the root in this way. It is a very powerful antiseptic, destroying all odor and all bacteria. I have used it in some very severe cases where there has been decomposed pulp for many years, and there was about as bad an odor arising from them as you could possibly imagine, and after cleaning out the canals this medicine was then pumped in and allowed to remain, and canals were then fiilled with cotton and allowed to remain without interruption for about two months, without any apparent deterioration in the medicine when it was removed. It has been so successful in my hands that I now use it exclusively in place of iodoform.

I had a case last Saturday night which seemed to me a little remarkable, which will prove its efficacy as a healing agent and its non-irritating quality,—a case of eczema, where the skin was all scaly for the past year; deep cracks, which would bleed at the slightest touch, and I had been unable to heal them. I tried the "Tribromphenol-Bismuth," first wetting the parts with trikresol, and then covered it with "Tribromphenol-Bismuth," dressed it again twice on Sunday, and on Monday morning the parts were entirely healed and there was not one particle of soreness. Just thirty-six hours healing that which resisted all applications for a year. This is a German preparation imported by Schering & Glatz, of New York.

Dr. THOMAS C. STELLWAGEN, of Philadelphia, read the paper of the evening, entitled "Dentistry or Stomatology," which is printed in full at page 265 of the current number.

### *Discussion.*

Dr. STELLWAGEN. I contend that a great many of the proceedings of dental associations and a great deal of what appears in our dental journals is no more dentistry than it is any other special study of the healing art. Oftentimes it is as much or more nearly related to pathology, rhinology, laryngology, otology, or ophthalmology as it is to dentistry, showing that a very large percentage of the articles are either out of their proper field, or else that we ought to change the name of our profession and take the proper one.

Through the kindness of the editor of the DENTAL COSMOS, I have been allowed to look over the indexes of these journals since 1891, and I find that in 1891, out of fifty-one original articles, fifteen were upon subjects not strictly dental. In 1892, out of fifty-six original articles, sixteen were not dental. In 1893, out of sixty original articles, fourteen were not dental. In 1894, out of seventy original articles, sixteen were not dental. In 1895, out of forty-five original articles, twenty-one were not dental.

In 1896, out of sixty-two original articles, sixteen were not dental. So that in six years about twenty-eight per cent. of the matter in that journal did not refer directly to dentistry. My contention is that the time has come to adopt a proper term, and discontinue the exclusive use of one which is entirely too limited to cover the ground in which we work, and which does not encourage the development of knowledge of the surrounding territory, which surely most appropriately should be done by the dentist. It belongs to him, as he is by his daily duties better suited and prepared for that labor than any one else.

Dr. FOSTER. It seems to me, as a representative of the medical profession, knowing next to nothing about dentistry, stomatology, or odontology, that the questions raised in the paper are two:

First, as to the origin of the word "stomatology." It seems to me that the doctor is perfectly correct. There is no objection whatever, so far as I can see, to the use of the word.

As to the other question,—the propriety of exchanging the term "dentistry" for "stomatology,"—that is entirely for the dental profession to decide. If, as a matter of fact, they generally or largely go into the treatment of diseases of the oral cavity, I do not know of any good reason why they should not style themselves "stomatologists," if they wish to. I have an unbounded respect for dentists, and I do not think I should have any more respect for them if they called themselves "stomatologists."

Dr. JAMES MCMANUS. I think about five or six years ago, at a meeting of the Connecticut State Dental Association, we had the pleasure of a paper by Dr. Stellwagen, and at a little banquet later in the evening he made quite extensive remarks on this topic. At that time I listened to him, and I then thought and kept on thinking for quite a while afterward that he was a good bit wild in his ideas, and I do not think that I enjoyed the remarks he made that night, because I felt that dentist was a pretty good name. But later, and more particularly within the past two or three years, I have thought more on the subject, and I can agree quite well with nearly all that he has said to-night. I think that dentist, as it is generally understood, means simply filling and extracting teeth and making artificial teeth; but if dentists desire to have recognition as a profession they must be able to do more for humanity than simply fill and extract teeth, or make artificial ones. There are many cases coming up that require more skill and more intimate knowledge than the ordinary dentist pretends to have. Dr. Stellwagen gave us an illustration about an abscess on the lower jaw. Some months ago I saw a case where I urged the lady to have a lower bicuspid taken out, but she retained it. All the time there was pain in the lower jaw, and there was an appearance as though there would soon be a discharge. She went to a physician, and he spoke of it as a wen, which he expected to cut out. I urged her to have the tooth out, and finally she did, and I found in the root-canal a broken instrument. That tooth had been giving her trouble for two years or more. This is an illustration similar to the one that Dr. Stellwagen has just given.

I must say that to-day I agree more and more with the position that Dr. Stellwagen has tried to enforce for the past few years. When years ago he commenced on this topic, I could not take much stock in it, but I now think his position is right.

Dr. S. G. Perry. I am in sympathy with Dr. Stellwagen in his desire for a proper term for our profession, but I am not altogether satisfied with the word which seems to be in the air at the present time. I am sure that were it announced on our cards that we were stomatologists a great many patients would say, "Doctor, have you changed your profession? Are you treating people who are sick at the stomach?"

It would take a long time, I think, to set ourselves right before the public in such a way that we would not be, to a certain extent, ridiculed. If we could find a better term than "stomatology," I should be more ready to see the change made. My preference is for the word "odontology." I think that is a better term. I think the idea in the minds of most people regarding the word stomatology is that it is something that applies to the stomach. I remember my first encounter with the word when Cohnheim described the passage of the white blood-corpuscles through what he termed the "stomata" of the inclosing vessels. The word comes from the Greek, signifying little holes, openings, or mouths. I suppose the stomach might be called a little hole. At any rate, its derivation is from the same Greek root "stoma." It does not seem to me, therefore, that the term is distinctive or direct enough.

Dr. O. E. Hill. There seems to be a very conservative element here in regard to this matter. I am opposed to the new name. I think it is absurd. I think Dr. Stellwagen is making a great mistake. It is a change which I do not understand. I cannot for the life of me see how that would broaden our profession at all. And even if it did, there is no question whatever but that a dentist gets his living and that his life-work is in filling teeth. There is no dentist in the state of New York, nor in any other state in the United States, who can practice dental surgery in his every-day practice. This needs must be a specialty. Of course, in these simple cases of abscesses, that is quite another thing, and that comes entirely within our range, because it applies absolutely and solely to the teeth. It seems that this change of name is putting on airs. It does not amount to anything. We are all dentists, and everything pertaining to dentistry is dental, and it is decisive and distinct, and everybody knows just exactly what it is. Think for a moment, if we had that name on our houses, who would know what it was? But I do not think that is any argument; people become used to that sort of thing. The real objection is that it is entirely unnecessary. Stomatology is too long, there is too much of it, and it is fully as large as, if not a little larger than, the profession itself. We ought not to go back to the dead languages for words. Very few people study Greek nowadays. We are thoroughly alive, and we do not want any of it.

Dr. S. C. G. Watkins. It seems to me it is really a very serious question,—something that should be taken up with great care.

I do not know that I am quite satisfied with the name "dentistry," and I do not know that I am satisfied with "stomatology." It strikes me that there are some other names which could be used which would cover the ground more satisfactorily than either of those. Would it not be wise for the different societies to appoint committees to consider this matter? The subject has been talked of a great deal, but nothing definite has been done. If committees were appointed to take the matter up and report to their societies, and then later on report to the national society, and so on, perhaps we could become unanimous in deciding upon some name; but the way the matter stands now, it seems to me that we are all at sea, and really I should hesitate for some time before I should put out a sign "Stomatologist."

Dr. RHEIN. I must say that the paper of Professor Stellwagen has impressed me very favorably with the urgent need that exists at the present date for us to cast off, as it were, the shackles that bind us in the public eye with the men who have glaring signboards strung up on the public highways; and if a move of this kind is adopted, if it has no better effect than making this distinction, it will be a great advantage to what I call the respectable element that devotes its attention to the ailments of the mouth.

I do not know whether I can speak for all the members of this society in this matter, but I know personally there is nothing more unpleasant and uncomfortable than to have some layman compare me with somebody who has a twenty-foot sign strung up on the Bowery or Third avenue, or some such place as that; and if the united societies of this country would at a certain time abandon the use of this word and adopt the best one upon which we could determine, I think it would be a great satisfaction to the men who have been scientifically studying this specialty to be able to say that we are not dentists. Of course, there are a great many obstacles in the way. I think the greatest of all is the degree of D.D.S. that so many of us possess. That is the one obstacle that has always stared me in the face when considering the question of this change of name. I think that is the great stumbling-block, and I do not believe that any other exists that cannot easily be overcome. I myself do not feel at all perfectly satisfied at the present time with the word "stomatologist;" but if, after mature deliberation, no better word could be discovered, I would infinitely prefer it to the word "dentist," simply because of the bad odor that has accompanied the name, and that clings to it through its association with men whom we know are not only incompetent to practice upon humanity, but who are not legitimate professional men. I simply call attention to this one point, that seems to have escaped the general observation, as a strong argument in favor of a radical change, and I agree with the last speaker that the proper way to take hold of this subject is the appointment of various committees as the only method by which any result will be accomplished. I believe that notwithstanding the quasi arguments of our friend Dr. Hill, from Brooklyn, it would take very little to get Dr. Hill to take the other side of the fence.

Dr. Hill. Perhaps you would much prefer to have these gentlemen who have twenty-foot signs on the Bowery change their signs to "Stomatological Parlors." They would have them within a week. They are the people who would like the big word.

Dr. Rhein. No; I do not think they would do that. I question that very seriously. I do not think there is any necessity for our putting on our signs the fact that we are stomatologists. The mistake that we have made for a number of years is the supposition that we ought to put anything of that kind on our door-plates. Many of us for some time have come to the conclusion that if we put ourselves on a par with any other specialist, our name is all that is required; if we add the title of our degree, or something of that kind, it is a matter of personal taste. I have for some years dropped the use of the word "dentist" from my door-plate, and I am perfectly content to have my name appear and nothing else. I do not think we do anything to aid our practice by adopting the word "dentist," and I think that would be the easiest way to shirk that part of the subject that Dr. Hill speaks of. The Bowery dentists would not know we called ourselves "stomatologists." I believe that for a long time a great many of our medical brethren have turned their noses up in the air and sniffed when they entered our portals and saw "Dr. Jones, Dentist," on the sign, as something that is just a little beneath them.

Dr. Caille. I was invited here by Dr. Walker to make a few remarks. I think we all have to work out our own salvation. I found that out by hard experience. I have a degree that I do not wish to flaunt before this society at all, but that degree does not limit me in the practice of stomatology, or any other "ology" connected with the medical profession, and that is the medical degree. You cannot broaden the dentist by changing the name of his specialty. Until the dentists see that, they will be working along in the dark. I have the greatest respect for men who have worked to build up dentistry and make it an honored profession. Those good men did not have to take any degree. Then came the time when the dental colleges were formed, and they took the dental degree, and I remember that before I took the dental degree a great many men said it was not necessary; but I finally did it. I remember Professor Weisse brought cases and said, "I will show you these cases, but you won't be qualified to treat them," and I determined to take a degree that would enable me to treat such cases and in which I would not be limited to dentistry; so I took the medical degree, and I believe the time will come when all dentists will take the medical degree and dental colleges will go to the wall. We want a medical degree, and the men who have been in the fight and built up dentistry should not stand in the way of the young men coming into the profession taking the medical degree. I am going to fight to the last pitch to prevent the medical profession from sticking up their noses at our profession. If you want to find out that they do that, go into the hospitals as dentists. As to the men who did that to me, their noses have gone down very far since then.

Dr. W. C. BARRETT. I believe in "stomatology;" that is, I believe in broadening our practice to its utmost limit just as fast as we will qualify ourselves for it. I would have it include every disease of the oral cavity, or of the cavities connected with the oral cavity. I teach in two colleges, dental, and in all my instruction there is no allusion to a dental instrument. And yet I teach what is pure dentistry. I never show an instrument except surgical ones, and yet I give more lectures than any professor in either the Buffalo or the Chicago college. I don't ignore or despise dental instruments, by any means, but I teach that there is something more to a broad dentistry than amalgam and red rubber. Mechanical art is not all there is to our profession, important as is that department. The man who would confine dentistry to mere mechanics is no more of a professional man than is the shoemaker, who must study the anatomy of a part of the organism if he would be a good shoemaker. He must know the structure of the foot, at least.

There are twenty-five thousand dentists now. A century ago there were not near as many hundreds. And yet then there was not enough for the few to do. How has there been made room for the thousands of to-day, if it has not been by enlarging the field? Consider what was the practice of a hundred years ago, and then compare with it that of the present. A hundred years hence there may be ten times as many dentists as now, in proportion to the population, and they may have a great deal more to do, provided the field be extended, as it may legitimately be.

That is what I mean by extending our practice. That is what I mean by stomatology. You may call it by what name you will. I am for making of dentistry all that its possibilities permit, and they are almost limitless.

Dr. CAILLE. I do not know just what the law says, but I do not think that law will stand five minutes. Judge Beach handed down a decision in which he said a physician could practice dentistry, but a dentist cannot practice medicine. A physician can practice any specialty he pleases.

Dr. WALKER. Not in New York state. A physician cannot practice dentistry in New York state.

Dr. STELLWAGEN. It seems that all the opposition that has been expressed was met in the written remarks, with the exception of the fact that they did not recognize, or at least did not state, that "stomatologist" required one more letter than "odontologist." But it may be added that one of the best arguments made for the change of the name has been advanced by the opposition. The very parties against whom we want to draw the line and get rid of are those who use huge, vulgar, gaudy signs to cover a house with the word "dentist." Our state laws, that were claimed to be enacted to protect the people from imposition, have worked beautifully! We now have the "Dental Parlors" of Buffalo, of New York, and of Boston. Such shops are not to our credit as a profession. We would rid our profession of them. It is not that we want to ignore the honorable dentist; we would elevate the science and the art, and there is no need of apology to the dentist. A stomatologist is a dentist and something more. His education must be somewhat broader, whether he gets it from a medical or a dental college. Is not our friend a little mistaken about his medical degree permitting him to practice dentistry? A medical degree does not permit one to practice dentistry in accordance with the statutes of several states. No right-minded man with simply a medical education would feel that he was qualified to practice any specialty of the healing art unless he had the fullest preparation for that specialty. The ophthalmologist goes through special training; the otologist likewise studies in special courses, and so on. Many of us remember when the ophthalmologists were called oculists, and there was no little controversy when they gave up that name and took the new. All these arguments were gone over in those days. These specialists do not display a special sign. Can any one recall a single case where an ophthalmologist has a sign? I do not see any more reason for a dentist to encourage the carver, painter, or gilder of signs. Most of our profession are familiar with the general elementary principles of the practice of medicine, and with a very little attention to the study many, even those who oppose the change at the present day, would be quite as well, or indeed better, fitted to explore this territory, where no one seems to want to take the responsibility. The regular physician does not have the time or manual training to treat these cases. Dentists do not want to, simply because they are too modest. That is the whole sum and substance of it. The dentists must overcome that modesty, and consider the value and importance to a patient suffering from disease in that neutral territory. These suffering ones need some one who can care for them and open an abscess of the jaw into the mouth and not under the chin! When such an one has to have a superior maxilla removed, particularly has he a right to be saved the scar and the pain of a gash on the outside of the face. The ability to operate through the mouth is not inborn, but by practice comes of a peculiar handcraft or manipulative ability. The dentist has this, and is practicing it all the time. If he claims to be a stomatologist, he must not for that reason give up his dental practice. He should keep his *tactus eruditus* by daily application to dental work, and take the other responsibilities. It would not change the practice, but only add to it. A physician, knowing that A, B, C, had studied in that direction and was ready to be consulted in such cases, would only be too glad to relieve himself and send the patient to A, B, C. We do not want to go out and drum up patients. None of you gentlemen cares about having a title on your signs that would indicate what you are, because you do not get your practice that way. How many of you would augment your daily round of work by adopting the use of a sign to indicate your calling? We do not want to give up dentistry. We have no disrespect nor disregard for it. We should be more familiar with ailments of the mouth than any one else; we must of necessity be. We are looking into the mouth daily and hourly; there is where we are at home,—more at home than anywhere else. It seems that this labor must come to us if we do our duty; and if we do not, our patients are the sufferers,—greater than they would be if regular dentists took up the cases. Our dental colleges to-day give better instruction in the general principles of medicine than the medical colleges did twenty or thirty years ago. Then a man who graduated in medicine had not as thorough and complete an education in his profession as to-day the graduate of a dental college has in the healing art. There is no reason why the dental college should not give thorough foundation in the principles of medicine and surgery, and most of them do. In the dental colleges students are expected and required to know their anatomy from the foot to the top of the head, to be proficient in medicine in all its branches, except perhaps the finer points of otology, gynecology, and some few specialties.

Dr. PERRY. Might I ask if you do not think the word "stomatology" rather unfortunate? Do you think it would be satisfactory to the profession as a new word?

Dr. STELLWAGEN. After having been years and years looking over this ground, that word seems to be the only truly comprehensive one. At one time oral surgery seemed to be accepted as covering it. But it does not. It fails in that it is not broad enough. Oralist has been suggested; that comes very near. But odontologist, which was suggested, does not cover the ground any better than dentist. It is dentistry, pure and simple, and this term is too restrictive. It is like saying a man has seventy points when in reality he ought to have credit for nearer one hundred points. Dentistry probably would cover seventy-five per cent. of the practice of the stomatologists, or eighty per cent. or ninety per cent., if you please; but let him be able to take the other cases, and let him not be limited to the teeth alone for his field of usefulness.

Dr. HILL. I am thinking in what position will this change of name put us with scientific men?

Dr. STELLWAGEN. Is it not probable that if a physician reads or hears that there are stomatologists, he would at once be glad to consult with them and get for the patient any assistance or service in this direction? As with a case for an ophthalmologist, the family physician does not care to take the responsibility and sends it to the specialist. So the stomatologist should take charge of those cases which he is peculiarly qualified to treat.

Dr. WEISS. If the gentlemen are anxious to change the name, I do not think you can ever do it until you take the medical degree, and then there will have to be special schools in the instruction of stomatology. An ophthalmologist takes his medical degree, and then pursues special studies.

Dr. STELLWAGEN. That has been considered for years, too. The objection is simply that to take a medical degree in a respectable medical school will require a four years' course in a general college to graduate as an A.B., and then the student is in a position to matriculate in a medical school, where four years more of pupilage are demanded of him. He studies every special branch of medicine, and in all of these he has to pass rigid examinations. That takes a great deal of time that could be better employed upon other branches, and the difficulty is that he would be nearly thirty before he is ready to go into practice as a dentist or stomatologist, and the eyesight is often much impaired by the severe taxation of these organs. You know a great many dentists at forty-five or fifty begin to feel that it is about time to associate some younger person with them. It is a very serious question if it is wise to take from five to eight years out of the student's life, years in which he ought to be self-supporting. The stomatologist can get the general foundation of medicine, particularly that which he will most need, in the dental college as well as or better than in the medical school. If required to graduate from a medical school and then take a stomatological degree afterward, his studies would be unnecessarily prolonged.

We must not confound the practice of medicine with the healing art, which it aims to be, but, like all high and noble aims, it is not yet fully accomplished. I bow in reverence to the ambition, the work, the devotion of the M.D., but I know, as he realizes with regret, that his works as discoverer and scientist are not yet completed.

As to the degree of D.D.S., that would signify Doctor of Dentistry and Stomatology, if you choose, although it does mix up the Greek and Latin somewhat.

A vote of thanks was tendered to Dr. Stellwagen.

Adjourned.

John I. Hart, D.D.S.,
*Editor Odontological Society.*

## EIGHTH DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK.

On the evening of January 25, 1898, the members of the Eighth District Dental Society of the State of New York held their thirtieth annual dinner at "The Niagara," Buffalo.

After an hour's social enjoyment at the dinner table, the members and their friends listened to an essay by Professor E. C. Kirk, D.D.S., on "Some Phases of the Educational Problem."

Among the guests from abroad were Professor E. C. Kirk and Dr. E. T. Darby, of Philadelphia; Dr. Frank French and Dr. R. H. Hofheinz, of Rochester, N. Y., and Dr. Beam, of St. Catharines, Ontario.

W. E. Marshall, *Secretary,*
341 Pennsylvania street, Buffalo, N. Y.

# DENTAL SOCIETY ANNOUNCEMENTS.

## DENTAL SOCIETY OF THE STATE OF NEW YORK.

The thirtieth annual meeting of this society will be held at Albany, May 11 and 12, 1898. Papers will be presented by the following members of the profession: M. W. Foster, M.D., D.D.S., Baltimore, Md.; M. H. Cryer, M.D., D.D.S., Philadelphia, Pa.; J. S. Marshall, M.D., D.D.S., Chicago, Ill.; I. N. Broomell, D.D.S., Philadelphia, Pa.; S. S. Stowell, D.D.S., Pittsfield, Mass.; E. A. Schillinger, D.D.S., Dalton, Mass.; R. Ottolengui, M.D.S., Correspondent; L. C. LeRoy, D.D.S., committee on practice.

All members of the profession are cordially invited to attend and participate in the exercises commemorative of the occasion.

H. J. Burkhart, *President,*
C. S. Butler, *Secretary,*
Buffalo, N. Y.

## ILLINOIS STATE DENTAL SOCIETY.

The thirty-fourth annual meeting of the Illinois State Dental Society will be held at Springfield, May 10–13, 1898. Dentists practicing in the state of Illinois who are not members of the society, and dentists of other states are cordially invited to attend. Hotels and railroads will make the usual reduction. A large attendance is desired and a profitable meeting is anticipated.

A. H. Peck, *Secretary.*

## HARRIS AND LEBANON VALLEY DENTAL ASSOCIATIONS.

A joint meeting of the Harris and Lebanon Valley Dental Associations will be held at the Springs Hotel, Lititz, Pa., May 17 and 18, 1898.

As the Pennsylvania State Dental Society owes its origin to a meeting of these associations at the above place thirty years ago, it is proposed to make the exercises harmonize with this fact; and in order to make them as interesting as possible a cordial invitation is extended to all professional brethren in good standing throughout the state to be present with us.

Edw'd P. Kremer, *Cor. Secretary,*
Lebanon, Pa.

## KANSAS STATE DENTAL ASSOCIATION.

The twenty-seventh annual meeting of the Kansas State Dental Association will be held at Topeka, May 10, 11, and 12, 1898. An interesting program will be provided. Members of the profession are invited to attend and participate in the proceedings.

Edward Bumgardner, *Secretary.*

## TEXAS DENTAL ASSOCIATION.

The regular annual meeting of the Texas Dental Association will be held this year at Waco, Tuesday, May 17, 1898. At the same time the State Board of Dental Examiners will convene. A cordial welcome will be extended all visitors.

J. G. Fife, *Secretary,*
Dallas, Texas.

## SOUTHERN WISCONSIN DENTAL ASSOCIATION.

THE fourth annual meeting of the Southern Wisconsin Dental Association will be held in Dodgeville, Wis., Wednesday and Thursday, May 3 and 4, 1898. A cordial invitation is extended to the profession at large to meet with us.

Dr. W. J. FUNSTON, *President*,
J. H. REED, D.D.S., *Secretary*,
Lancaster, Wis.

## TRI-STATE DENTAL MEETING.

THE Tri-State dental meeting will be held at Put in Bay, Ohio, beginning June 21, 1898, and continuing for three days. Reduced railroad and hotel rates have been secured, and the prospects are bright for one of the best and largest meetings ever held in the central states. Details will be given in succeeding issues of the DENTAL COSMOS. J. WARD HOUSE.

## IOWA STATE DENTAL SOCIETY.

THE annual meeting of the Iowa State Dental Society will be held in Des Moines, May 3, 4, 5, 6, 1898. WILLIAM GILMORE CLARK, *Secretary*.

## PENNSYLVANIA BOARD OF DENTAL EXAMINERS.

THE Board of Dental Examiners for the state of Pennsylvania will hold two examinations, this spring, of candidates for license to practice dentistry in this state. The first commencing April 12, simultaneously in Philadelphia and Pittsburg; the second commencing June 14, in Philadelphia. Each examination will take four days.

In making application to the Dental Council at Harrisburg, for a license, those desiring to come before the board in April will please state in which city they prefer to be examined. J. C. GREEN, *Secretary*.

## WEST VIRGINIA STATE BOARD OF DENTAL EXAMINERS.

THE West Virginia Board of State Dental Examiners will meet at Parkersburg, W. Va., April 21, 22, 23, 1898, for the purpose of examining candidates who desire to enter upon dental practice in West Virginia.

JAMES R. STATHERS, Sistersville, W. Va.

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# EDITORIAL.

## VAGUE AND INDEFINITE CACHECTIC CONDITIONS DUE TO LATENT RHEUMATIC OR GOUTY TENDENCIES.

THE following communication, published in the *International Journal of Surgery* for March, presents an accurate clinical picture of a set of systemic complications which are the typical expressions found in those individuals who are the subjects of that form of phagedenic pericementitis which has been denominated gouty pyorrhea. We reproduce it here not only because of the lucid picture of the general symptoms of the diathesis which it gives, but for the therapeutic suggestion which it contains.

Local treatment of pyorrhea cases having their expression in the mouths of patients presenting the systemic symptoms noted, is simply palliative and without permanent benefit; whereas a radical and permanent improvement is generally obtainable where the systemic factor is recognized and rationally treated along the lines indicated in the letter quoted:

"The physician is frequently called to see some patient who, though not ill enough to be in bed, is not at all well. His appetite is capricious, he sleeps indifferently, and aches all over on awakening. Sometimes this achy sensation is confined to the lower limbs, but more frequently it is in the loins. His urine in the morning is scanty and frequently high colored. The bowels may be fairly regular or just the opposite, although his habits of life are all that could be desired.

"The physician will naturally be puzzled, but will try an alterative, or possibly, suspecting malaria, will order a dose of calomel followed by quinin. If the mercury acts well the patient will probably find himself somewhat improved, or probably very much improved, temporarily, but he soon drifts back into the old condition, not sick and not well, but feeling 'miserably no account' all the time.

"A competent examination of the urine in these cases will, in almost every instance, be found to disclose a notable absence of the soluble urates. It may be loaded, on the contrary, with the phosphates, and very frequently bile will be present. If the condition remains neglected the probable results will be sooner or later a pronounced attack of rheumatism in one or another of its forms. All that is needed to induce such a condition is a sudden change in the weather, or exposure on the part of the patient to cold or wet, or a combination of the two. This is due to a latent rheumatic or gouty diathesis, to which every adult is liable.

"In such cases, the physician will find in tongaline liquid or in tongaline and lithia tablets a remedy which goes directly to the source of the trouble, seeking out the retained excretions or perverted secretions, and either neutralizing them or rendering them amenable to the physiological action of the emunctories, and then it brings to bear its strong eliminative powers. By its direct action on the liver tongaline accomplishes in a mild and continuous way what calomel does violently and explosively, and is thus free from the harmful results too frequently wrought by mercury. It stimulates the skin (a property due to the presence of pilocarpin salicylate) and sets it to carrying off, as perspiration, a large amount of the aqueous waste and the surplus sodium chlorid of the system. On account of relieving the kidneys from a portion of their heavy duties, tongaline thus directly aids them in the performance of their normal functions, viz, the removal from the system by a true dialytic process of those waste substances whose retention means disease and death.

"The combination of lithia with tongaline plays no unimportant part in this work, since, as is well known, the former seeks out and neutralizes the uric acid, that lurking demon of rheumatism, forming soluble salts which are removed by the kidneys and pass off with the urine.

"The painful parts should also be sponged with alcohol, then with tongaline liquid, and hot cloths saturated with the remedy held in position by oiled silk bandages, heat being applied by a hot-water bag or other convenient method to facilitate absorption. In like manner tongaline liquid may be given externally by the aid of electricity.

"FRANK L. JAMES, M.D., St. Louis."

## "SECRET" AND "PROPRIETARY" PREPARATIONS

THE editor of the *Philadelphia Medical Journal,* March 5, sheds the light of his acknowledged good sense upon the ethical distinctions to be drawn between proprietary and secret preparations, as follows:

"There seems to be a great misunderstanding and misuse of these two terms. Some persons use them as if they were interchangeable, and even make the word nostrum synonymous. It would appear unnecessary to say that everything that is advertised must be owned by some one, have somebody as proprietor,—*i.e.*, be 'proprietary' in order to have some one to pay for the advertisement. Chairs and bicycles and cod-liver oil, if they have the distinctive name of a certain maker attached to them, are proprietary preparations. We have heard copyrighting spoken of as if it were something wrong and shameful, whereas in itself it has no ethical significance whatever. It is only a brand of the manufacturer. It is the possible secrecy of the copyrighted article, or the abuse of the method of copyrighting, that makes wrong. In reference to drugs, for example, the manufacturers may conceal the nature of the ingredients, and such things then become secrets; in this case we say it is unprofessional to use or to advertise them. . . .

"The advertising of medicines of secret composition is the disgrace of medical journalism, and all physicians who have the honor and dignity of their calling at heart should demand that it be stopped. Should they cease to subscribe for journals that get an income in this way, the abuse would soon come to an end. There are, however, some practical difficulties in the way of a correct decision in not a few cases. One is that many organic constituents cannot of course be accurately analyzed. But in answer to this it may be said that there should be no need of having them analyzed. The manufacturer should supply the names and quantities of the constituents. His refusal to do so at once shows the desire to conceal, and this no genuine pharmacist would countenance.

"Until government, scientific laboratories, or the wealth of a great journal supplies the profession with means of testing all remedies chemically and therapeutically, we, as a profession, must absolutely ignore all nostrums or secret preparations, and build up our knowledge of the materia medica by clinical induction. In the mean time we may rest secure that in the vast majority of instances secrecy as to constitution or ingredients means valuelessness."

When it is considered that the foregoing is the official sentiment of a journal the policy of which is avowedly the maintenance of the highest ethical standards in relation to medical practice and medical journalism, it may well serve as a norm by which to correct some of the erroneous, not to say grotesque, ideas on the same subject prevalent in the dental profession.

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# OBITUARY.

## DR. W. E. RICHARDSON.

DR. RICHARDSON died at his apartments, Nos. 101 and 103 Main street, Batavia, N. Y., on December 5, 1897, after an illness of twelve days with broncho-pneumonia of typhoidal type, following fibrous bronchitis. For several days previous to his taking to his bed he had been ailing, but he did not regard his condition as at all serious. Constant confinement and close attention to his business had weakened his constitution so that he was unable to withstand the ravages of disease, and from the first it was feared that his case was hopeless. He was conscious up to within an hour before his death, and his last hours were free from pain.

Dr. Richardson was born on February 8, 1858, at Tecumseh, Mich., and was a son of the Rev. Chester C. Richardson, a Universalist clergyman. His early life was spent in Michigan and in several places in Western New York and in Pennsylvania. After a most thorough course of study he commenced the practice of dentistry in Bradford, Pa. He removed to Batavia seventeen years ago and had continuously resided there since, having built up a prosperous practice. He was distinctly a self-made man, and was completely wrapped up in his profession. The first fillings that he ever did were performed with instruments that he manufactured himself. He was particularly skillful in operative dentistry. While naturally of a genial disposition, Dr. Richardson's close attention to business had prevented him from being intimately known by a wide circle of friends, but no better evidence of the high respect and esteem in which he was held in the community could be desired than was given in the great interest which was manifested in him by people of all classes during his illness. Sincere hopes for his recovery were heartily expressed on every side, and in his death it is the unanimous expression that the community has sustained a great loss.

On January 17, 1878, Dr. Richardson was united in marriage to Miss Hattie Moulton, daughter of Mr. and Mrs. E. G. Moulton, of Alexander, who survives him with three children, Elbridge M., aged nineteen, who is a student in the Baltimore College of Dental Surgery; Edith M., aged nine years, and William C., aged five years.

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# HINTS, QUERIES, AND COMMENTS.

TO THE EDITOR OF THE DENTAL COSMOS:

*Sir,*—Concerning countersunk teeth and their repair as per article in February COSMOS, by Dr. J. W. Campbell, I agree with Dr. Campbell that the smaller molds and laterals are weak. If they are used only in cases where the "bite" is not especially trying and the ridge not too prominent (a full ridge and short upper lip make it impossible to use them), they will last fairly well, and certainly possess possibilities in the way of spacing, twisting, etc., as well as lingual contour not found in any other teeth except continuous gum.

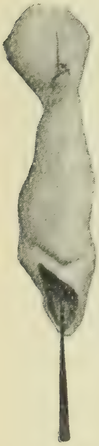
Dr. Campbell says that in case of breakage "nothing remains but to make a new set." If the breakage occur (as it usually does) by one of the incisors being pulled out of the rubber, leaving that part of the rubber which comes up *around* the neck intact, a very substantial repair, which will not show, may be made as follows:

Sink two small dowels of iridio-platinum wire into the plate (not going through), one on each side of the hole left by the pin. Let them project into the space in the tooth on each side of the pin. See that the tooth will go into place. Then cement as in crown-work, leaving it several hours to harden. HENRY D. HATCH, M.D.S.

NEW YORK, February 22, 1898.

VALVULAR OBSTRUCTION TO DISCHARGE OF PUS FROM AN ABSCESS, *via* PULP-CANAL.—The accompanying cut illustrates a specimen in my possession which has the following clinical history.

The patient, a man, aged forty, presented at the clinic of the Philadelphia Dental College with an abscess located upon the root of the upper right central incisor. The cause was a putrescent pulp, the pain severe and relief urgently demanded. The student in charge, familiar with such cases, opened the tooth for vent. No relief resulting, he cleansed the pulp-canal, using proper antiseptic precautions, and finally passed a probe carefully through the apical foramen into the abscess. The withdrawal of the probe was followed by neither pus nor blood. At this point my attention was called to the case, and the student's observation verified. The diagnosis of apical abscess was clear, yet the probe could be freely passed into the apical space with no result beyond irritation of the inflamed tissue. Perforation of the gum was suggested, but the patient demanded extraction, to which, nothing loath, I acceded. In the removal of the tooth the abscess sac remained adherent to the alveolus, a circumstance which favored the observation of the condition in which the apical end of the root was found. In the illustration the abscess sac has been restored.



After extraction a probe was passed through the canal, and upon its exit from the foramen was found to raise a small flap of fibrous tissue; as the probe was withdrawn the flap returned to its place. This valve, as it were, seemed to be a part of the pericementum slightly discolored by putrefaction products evidently originating in the pulp-canal. In apical abscesses the tension of the inflamed parts causes a flow of pus, usually followed by blood, immediately an exit is established through the canal. In this case it would seem that the pressure of the pus-column forced the flap of pericementum upon the apex of the root, causing it to obstruct the foramen and prevent the escape of the fluids.—OTTO E. INGLIS, D.D.S., Philadelphia, Pa.

OIL OF CLOVES.—Dr. L. S. Goble's word for oil of cloves prompts me to present a case in which this medicament gave most satisfactory results. A lady presented herself with left lower second molar, large mesio-occlusal cavity, filled with an amalgam plug inserted originally six months ago.

Thermal changes caused constant irritation, and finally continued odontalgia. Upon applying to her dentist for relief, the filling was removed, tooth treated and refilled. Irritation continued from thermal changes until patient came under my care. Removed filling; chamber full of amalgam; posterior root filled with cement; buccal fibril of anterior root exposed and very sensitive and angry from long-continued irritation.

> "'Twas filled by advertiser B.,
> Who gives a written guarantee."

Applied cocain and electrode, with mild current, for one-half hour; tooth still aching. Removed electrode, found pulp as sensitive as before; applied current again for fifteen minutes, with same result. Removed electrode and cotton, dried well, and applied small pellet of cotton with oil of cloves; placed electrode upon it, and instantly pain ceased. Current was not continued over four minutes. Removed electrode and cotton; no sensation whatever remained. Canal cleansed, filled, and filling replaced. Patient went out for luncheon and returned for another operation. Her report was, "The first time in six months I have eaten a meal with comfort."

Oil of cloves is a favorite medicine with me, and I use it in connection with my cataphoric instruments with great satisfaction to myself and to my patients.—HARVEY N. JACKSON, Milwaukee, Wis.

CAVITY LINING FOR ZINC PHOSPHATE FILLINGS.—Clinical experience, and conversations with other dentists, have convinced me that oxyphosphate of zinc fillings frequently cause irritation of the pulp, and available varnishes are not effective in preventing this action. A few experiments performed in the laboratory have seemed to confirm this impression. Of late I have adopted a practice that is seemingly effective. After the cavity is prepared, dried, and ready for filling, preferably, of course, with the rubber-dam on, I varnish it with hardened fir balsam dissolved in chloroform. Then I take a piece of No. 4 gold foil of proper size, which I have ready, carry into cavity, and carefully pat to place with pieces of cotton or kid, covering all the walls. I examine with magnifying glass and see that there are no uncovered places. If I find any I cover them with the foil. Into this gold-lined cavity or pocket of gold I place the cement. Of course it is not always easy to line these cavities,—the gold punctures or rolls up easily,—but if care is used, and the cotton, or kid, and pliers kept free from varnish, it is far from difficult. In calling the attention of one gentleman to this method he suggested the use of tin instead of gold foil, but the gold gives such a desirable color, and so little is needed, that I have given the tin no trial. If clinical observation on my part is reliable, this now seems an effective and desirable lining for the purpose suggested.—EDWIN DAY DOWNS, Owego, Tioga county, N. Y.

# LIST OF UNITED STATES PATENTS
## PERTAINING OR APPLICABLE TO DENTISTRY
ISSUED DURING FEBRUARY, 1898.

*February 1.*—No. 598,235, to J. WEISS. Dental appliance. (Articulator.)
" " No. 598,242, to J. R. CRANE. Valve and gauge for administering oxygen or other gases.
" " No. 598,295, to J. D. SMITH. Dental engine.
" " No. 598,303, to E. E. CRUZEN. Electric heater.

# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

**Indiana** (The) Dental Journal. Edited by George Edwin Hunt. No. 1, v. i, January, 1898. Indianapolis, 1898, Indiana Dental Journal Co.

**Schulz** (E. [J. J.]) Ueber Oberkieferresectionen mit einer kurzen Besprechung der in den letzten zehn Jahren in der Griefswalder chirurgischen Klinik zur Operation gelangten Fälle. Greifswald, 1897, J. Abel, 48 p. 8°.*

**Süssmuth** (A.) Beitrag zur Casuistik der Uranoplastik. Greifswald, 1897, C. Sell, 45 p. 8°.*

**Transactions** of the Illinois State Dental Society at the thirty-third annual meeting, held at Peoria, May 11–14, 1897. Chicago, 1897, H. D. Justi & Son, 282 p., 1 l. 8°.

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**Abert** (B.) How to conduct a dental practice in an agricultural district. South. Dent. J., etc., Macon, 1898, xvii, 8–11.—**Allen** (E. H.) Opinions of Illinois dentists regarding dental societies. Tr. Illinois Dent. Soc., Chicago, 1897, xxxiii, 50–70.—**Antal** (J.) Ujabb gyógyszerek a stomatologikus gyakorlatban. [New remedies in stomatological practice.] Orvosi hetil., Budapest, 1898, xlii, 16; 28.—**Arbeiten** zur Erforschung der Maul- und Klauenseuche. Veroffentl. d. k. Gsndhtsamtes, Berl., 1898, xxii, 105–108.—**Ausset** (E.) Accidents de la dentition. [Abstr.] Indépend. med., Par., 1898, iv, 25–28.—**Bacon** (S. M.) Hygiène des dents. Progrès dent., Par., 1897, xxiv, 353–358.—**Barrett** (R.) Notes on a case of composite odontome. Brit. J. Dent. Sc., Lond., 1898, xli, 53–55.—**Beetham** (J. W.) Treatment of teeth in a country practice. Dental Digest, Chicago, 1898, iv, 26.—**Bennett** (T. L.) Anæsthesia; gas and ether. Med. Rec., N. Y., 1898, liii, 296–298.—**Benton** (Charlotte E.) A porcelain-faced gold crown: half caps in bridge work. Items Interest, N. Y., 1898, xx, 97.—**Bernheim** (J.) **und D. Pospischill.** Zur Klinik und Bacteriologie der Stomatitis ulcerosa. Jahrb. f. Kinderh., Leipz., 1898, n. F., xlvi 434–449.—**Biró** (S.) Ueber die praedisponirenden Ursachen der Caries mit besonderer Berücksichtigung der Untersuchungen Black's und Williams'. Pest. med.-chir. Presse, Budapest, 1898, xxxiv, 73; 101; 127.—**Black** (G. V.) Instrument nomenclature with reference to instrumentation. Dental Digest, Chicago, 1898, iv, 1–25.—**Boisseau.** L'orthoforme; ses effets analgésiants en laryngologie et en stomatologie. Gaz. hebd. d. sc. méd. de Bordeaux, 1898, xix, 39–41.—**Bonmati** (J. X.) El diente humano no contiene marfil. Correo Internac. Odont., Madrid, 1896–97, ii, 728–739.—**Bottome** (F. A.) Congestion at the base of the tongue. Laryngoscope, St. Louis, 1898, iv, 31–33.—**Brubacher.** Heilung einer Eiterung und Kieferschwelung, nach 25 jährigem Bestehen, durch Behandlung der Zähne. Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 17–22.—**Cadwallader** (R.) Supernumerary tooth in the palatine vault. Med. Rec., N. Y., 1898, liii, 313.—**Case** (C. S.) Principles of force and anchorage in the movement of teeth. Tr. Illinois Dent. Soc., Chicago, 1897, xxxiii, 171–188.—**Christ** (J.) 37 bleibende Zähne in einem Munde. Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 22–24.—**Cigrand** (B. J.) Dietetic influences on the dental organs. Dental Rev., Chicago, 1898, xii, 96–106.—**Coulliaux** (L.) Pulpitas acuta. Cor.-Bl. f. Zahnärzte, Berl., 1898, xxvii, 49–65.—**Denamiel** (J.) Conveniencia de reconocer los dientes como medio de ilustrar algunos diagnósticos. Correo Internac. Odont., Madrid, 1896–7, ii, 739–744.—**Dennis** (G. J.) Report of a case of carcinoma of the buccal mucous membrane with microscopical exhibit. Am. J. Dent. Sc., Balt., 1897–8, 3. s., xxi, 399–401.—**Dental** law of Georgia. Am. Dent. Weekly, Atlanta, 1898, i, 245–248. ——— *Also:* Dental Cosmos, Phila., 1898, xl, 158–160.—**Douglas** (A.) Empyema of the antrum in a child three weeks old. Brit. M. J., Lond., 1898, i, 368.—**Eschelmann** (S.) Die Behandlung der Pulpakanäle. Cor.-Bl. f. Zahnärzte, Berl., 1898, xxvii, 65–71.—**Fillebrown** (T.) Some modifications of the operation for closing congenital fissures of the palate. Boston M. & S. J., 1898, cxxxviii, 105–107. [Discussion], 113.—**Flickinger** (A.) Sectional piece of porcelain bridge-work, allowing the removal of one or both sections. Dental Digest, Chicago, 1898, iv, 25.—**Fränkel** (B.) Ein Zahn in der Nasenhöhle. Charité-Ann., Berl., 1897, xxii, 454–457.—**Franklin** (M. M.) Retropharyngeal abscess ulcerating into the left internal carotid artery (?) followed by right sided hemiplegia with aphasia and recovery. Med. News, N. Y., 1897, lxxii, 237.—**Fulton** (W. B.) To what extent are we justified in giving our patients systemic treatment. Ohio Dent. J., Toledo, 1898, xviii, 74–77.—**Gaine** (C.) Imprisoned tooth; an obscure cause of cervical abscess. Lancet, Lond., 1898, i, 330.—**Geiger**. Herstellung künstlicher Gaumenfalten und einer gleichmässigen Plattendicke bei der Kautschukprothese. Cor.-Bl., f. Zahnärzte, Berl., 1898, xxvii, 41–45.—**Gibson** (G. H.) Dental education of the public. Dental Rev., Chicago, 1898, xii. 93–95.—**Gillet** (H. W.) Cataphoresis. Items Interest, N. Y., 1898, xx, 111.—**Goslee** (H. J.) The advisability of devitalization, banding and removal of enamel in crown and bridge work. Dental Rev., Chicago, 1898, xii, 87–93.—**Gurlt** (E.) Zur Narkotisirungs-Statistik. (Sechster Bericht 1895–96, 1896–97.) Verhandl. d. deutsch. Gesellsch. f. Chir., Berl., 1897, xxvi, 2, 202–248.—**Hagedorn** (M.) Das benigne Pharynxgeschwür (Heryng). Aerztl. Centr.-Anz., Wien, 1898, x, 17–19. —**Hallam** (H.) A case of bilateral herpes zoster of the trifacial nerve. Quart. M. J., Sheffield, 1897–8, vi, 123, 1 pl.—**Hand** (C. J.) Gold cusps for porcelain teeth. Items Interest, N. Y., 1898, xx, 98.—**Harper** (W. E.) Classification of cavities, and rules governing their preparation. Tr. Illinois Dent. Soc., Chicago, 1897, xxxiii, 71–93.—**Hartleb** (R.) Ueber die Infektionsfähigkeit lebender Pflanzen mit dem bei der Maul- und Klauenseuche vorkommenden Bakterium. Centralbl. f. Bakteriol. [etc.], 2. Abt., Jena, 1898, iv, 26–30.—**Hawley** (C. A.) Secondary, or storage, batteries for cataphoresis. Ohio Dent. J., Toledo, 1898, xviii, 66–70. —**Heath** (C.) Hypertrophie des Zahnfleisches. Cor.-Bl. f. Zahnärzte, Berl., 1898, xxvii, 45–49.—**Henie** (C.) Untersuchungen über die Zähne der Volksschüler zu Hamar in Norwegen. Ztschr. f. Schulgsndhtspflg., Hamb., 1898, xi, 65–71.—**Herzfeld** (J.) Ueber eine einfache Methode des Abschlusses und gleichzeitigen Offenhaltens der künstlich angelegten Kieferhöhlen-Oeffnungen. Monatschr. f. Ohrenh., Berl., 1898, xxxii, 25–27.—**Hinman** (H. B.) Some failures attending the use of Weld's chemico-metallic method of filling root-canals. Ohio Dent. J., Toledo, 1898, xviii, 65.—**Hirschkron** (J.) Zur Behandlung des Trigeminus-Neuralgie. Centralbl. f. d. ges. Therap., Wien, 1898, xvi, 15–20.—**Hopson** (M. F.) Notes on fifty consecutive cases of devitalized teeth treated with mummifying paste. Brit. J. Dent. Sc., Lond., 1898, xli, 154–157.—**House** (D. A.) Crown and bridge work. Indiana Dent. J., Indianap., 1898, i, 95–102.—**Hunt** (A. O.) The relation of the teeth to the lips and face. Tr. Illinois Dent. Soc., Chicago, 1897, xxxiii, 146–153.—**Hyatt** (T. P.) The relation of the second district dental society to students, as a factor in dental education and ethics. Items Interest, N. Y., 1898, xx, 112–115. –**Inouye** (H.) [Operation of amputating the cancerous root of the tongue without interfering with the inferior maxillary bone.] Tokyo Iji-Shinshi, 1897, no. 1028, 1. ——— *Also:* Chiugai Iji Shimpo, Tokio, 1897, xviii, no. 24, 6–8.—**Jung** (C.) Ueber eine Verbesserung an Obturatoren. Cor.-Bl. f. Zahnarzte, Berl., 1898, xxvii, 37–41.—**Kelly** (A. B) Large pulsating vessels in the pharynx. Glasgow M. J., 1898, xlix, 28–34.—**Kicer** (G.) Three cases of acute, miliary tuberculosis of the pharynx. Laryngoscope, St. Louis, 1898, iv, 90–96.—**Krönlein**. Ueber Pharynxcarcinom und Pharynxexstirpation. Verhandl. d. deutsch. Gesellsch. f. Chir., Berl., 1897, xxvi, i, 105–109.—**Küttner**. Ueber die Lymphgefasse der Zunge, mit Beziehung auf die Verbreitungswege des Zungencarcinoms. *Ibid*, 120–125.—**Laaser** (M.) Zur Operation der "adenoiden Wucherungen." (Rachentonsille). Allg. med. Centr.-Ztg., Berl., 1898, lxvii, 137–140.—**Lawshe** (A. R.) Aesthetic bridge work. Items Interest, N. Y., 1898, xx, 92–94.—**Ledyard** (F. K.) Ancient dentistry; answer to Dr. William H. Trueman's paper. *Ibid:* 85–87.—**Loeffler und Frosch**. Berichte der Commission zur Erforschung der Maul- und Klauenseuche bei dem Institut für Infectionskrankheiten in Berlin. Deutsche med. Wchnschr., Leipz. u. Berl., 1898, xxiv, 80; 97.—**Loveland** (A. E.) A study of the organs of taste. Tr. Am. Micr. Soc., Buffalo, 1897, xix, 129–174, 3 pl.—**McBurney** (C.) Cancer of the lip. Internat. J. Surg., N. Y., 1898, xi, 47.—**McCardie** (W. J.) Death under chloroform. Brit. M. J., Lond. 1898, i, 368.—**McGraw** (D. F.) Electrical osmosis. Items Interest, N. Y., 1898, xx, 104–108.—**McLean** (W. T.) A method of treatment to promote the utility of pulpless teeth. Ohio Dent. J., Toledo, 1898, xviii, 61–65.—**Maercklein** (R. E.) New regulating appliance. Dental Digest, Chicago, 1898, iv, 30–33.—**Marco** (B. B.) A system to assist in the identification of criminals and others by means of the teeth. Dental Cosmos, Phila., 1898, xl, 113–116.—**Melsome** (W. S.) An unusual form of facial paralysis. Pediatrics, N. Y. & Lond., 1898, v, 159.—**Meyjes** (W. P.) Die Behandlung des Empyems des Oberkiefers. Monatschr. f. Ohrenh., Berl., 1898, xxxii, 22–24.—**Morehead** (W. W.) Cataphoresis. Items Interest, N. Y., 1898, xx, 108–110.—**de Molènes** (P.) Leucoplasie bucco-linguale; symptomatologie, pathogénie et traitement. J. de méd. et chir. prat., Par., 1898, lxix, 49–70.—**Myles** (R. C.) Basil and basilateral diseases of the faucial tonsils, with improved instruments for treatment of same. Laryngoscope, St. Louis, 1898, iv, 127–134.—**Navarro** (R.) Interpretación hipotética de algunos síntomas del gusto. Siglo méd., Madrid, 1897, xliv, 802–805.—**Neisser** (A.) Lippen-Ekzeme und Mundwasser. Therap. Monatsh., Berl., 1898, xii, 79.—**Nutting** (C. W.) The building of a small contour filling with gold. Dental Rev., Chicago, 1898, xii, 77–80.—**Oliver** (R. T.) Management of fractured lower jaws. Indiana Dent. J., Indianap., 1898, i, 83–95.—**Ottofy** (L.) The articulation of crowns and bridges. Dental Rev., Chicago, 1898, xii, 85–87.—**Ottolengui** (R.) A method of crowning roots decayed below the gum margin. Items Interest, N. Y., 1898, xx, 99–101. ——— Faculties vs. examiners. Dental Cosmos, Phila., 1898. xl, 116–119.—**Owen** (E.) On the operative treatment of cleft palate. Lancet, Lond., 1898, i, 273–276. —**Owen** (E. B.) Incidents of office practice. Dental Digest, Chicago, 1898, iv, 27–30.—**Partsch.** Ersatz des Unterkiefers nach Resection. Verhandl. d. deutsch. f. Chir., Berl., 1897, xxvi, 416–433.—**Payne** (R. E.) A new porcelain crown pin and root-seal. Items Interest, N. Y., 1898, xx, 88.—**Peach** (H.) A porcelain-faced crown for bicuspids or molar teeth. *Ibid:* 90.—**Pearsall** (W. B.) The edentulous mouth. J. Brit. Dent. Ass., Lond., 1898, xix, 23–30.—**Peck** (A. H.) Results of experiments in bacteriology. Tr. Illinois Dent. Soc., Chicago, 1897, xxxiii, 189.—**Powell** (A. A.) Cast aluminium dentures. Items Interest, N. Y., 1898, xx, 116.—**Proben** (C. J.) The removal of adenoid growths of the nasopharynx. N. York M. J., 1898, lxvii, 249–252. [Discussion], 260.—**Reed** (C. S.) Triangular pins for crowns. J. Brit. Dent. Ass., Lond., 1898, xix, 99.—**Reinhardt** (J. H.) Buttner crowns. *Ibid:* 30–34.—**Resolutions** on death of Dr. Thomas W. Evans. Dental Cosmos, Phila., 1898, xl, 156–158.—**Rhein.** Un caso de piorrea alveolar. Rev. dental amer., Phila., 1898, vi, 22–26. —**Ritter** (P.) Beitrag zur Diagnose der Antrum Erkrankungen. Cor.-Bl. f. Zahnärzte, Berl., 1898, xxvii. 33–37.—**Ruggles** (S. D.) The preparation of compound cavities in anterior teeth. Ohio Dent. J., Toledo, 1898, xviii, 57–61.—**Robinson** (F. S.) Extraction under anæsthesia. Dental Rev., Chicago, 1898, xii, 81.—**Röpke.** Beitrag zur Casuistik der acuten Osteomyelitis des Oberkiefers bei Säuglingen. München. med. Wchnschr., 1898, xlv, 125. ——— *Also:* Ztschr. f. Ohrenh., Wiesb., 1898, xxxii, 161–165.—**Röse** (C.) Ueber den Einfluss der Bodenbeschaffenheit auf die Haufigkeit der Zahnverderbniss. Munchen. med. Wchnschr., 1898, xlv, 82.—**Rowlett** (A. E.) Tartar. Guy's Hosp. Gaz., Lond., 1898, xii, 51–54.—**Samter** (O.) Zur Operation complicirter Hasenscharten. Verhandl. d. deutsch. Gesellsch. f. Chir., Berl., 1897, xxvi, 2., 249–256.—**Schrieber** (Max.) Geschichte der operativen Kieferklemmentherapie. Cor.-Bl. f. Zähnärzte, Berl., 1898, xxvii, 24–33.—**Schulz** (R.) Untersuchungen über die chemische Zusammensetzung normaler Menschenzähne verschiedenen Alters, mit Berücksichtigung aller drei Hartsubstan. *Ibid:* 1–24.—**Scott** (A. C.) Resection of the lower jaw with report of two cases. Tr. Texas M. Ass., Austin, 1897, 86–92, 1 pl. —**Seifert** (R.) Investigaciones sobre los dentríficos. Correo Internac. Odont., Madrid, 1896–7, ii, 824–833.—**Seligmann** (J.) Uebersicht über die Entwicklung der Zahn- und Kieferprothese bis in die neuere Zeit und kurze. Angabe des Standpunktes derselben in der neuesten Zeit. J. f. Zahnheilk., Berl., 1898, nos. 1–4.—**Simmons** (S.) The pulp; its conditions and treatment. Brit. J. Dent. Sc., Lond., 1898, xli, 145–152.—**Simon** (S.) The relation of the operator to the anæsthetist. Med. Rec., N. Y., 1898, liii, 230.—**Skidmore** (L. W.) Anchoring large contour fillings in incisors. Tr. Illinois Dent. Soc., Chicago, 1897, xxxiii, 134–145.—**Smith** (A. G.) How shall we best insert a gold filling. *Ibid:* 121–133. —**Snyder** (C. L.) Erosions as found in the orient; cause and effect. Dental Rev., Chicago, 1898, xii, 107–110.—**Stearns** (C. H.) Amalgam. *Ibid:* 82–84.—**Talbot** (E. S.) A study of the deformities of the jaws among the degenerate classes of Europe. J. Am. M. Ass., Chicago, 1898, xxx, 369–371.—**Templeton** (J. G.) Practical things in dental practice. Tr. Illinois Dent. Soc., Chicago, 1897, xxxiii, 154–170.—**Toeplitz** (M.) Mycosis pharyngis leptothricia. Med. Reg., Richmond, 1897–8, i, 355–360.—**Tomes** (C. S.) Partial suppression of teeth in a very hairy monkey (Colobus caudatus). Brit. J. Dent. Sc., Lond., 1898, xli, 49–53.—**Turner** (G. W.) Corner gold fillings in porcelain-faced crowns. Items Interest, N. Y., 1898, xx, 96.—**Valdés** (J.) Saliva. Correo Internac. Odont., Madrid, 1896–7, ii, 819–824.—**Walkhoff** (O.) Beiträge zum feineren Bau des Schmelzes und zur Entwickelung des Zahnbeins. Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 1–16, 3 pl.—**Wallas** (S. H.) A case of antral disease. J. Brit. Dent. Ass., Lond., 1898, xix, 35–38.—**Ward** (C. H.) Human teeth from a comparative standpoint. Dental Cosmos, Phila., 1898, xl, 95–113. —**Warren** (J. C.) Modern operation for cancer of the lip. Boston M. & S. J., 1898, cxxxviii, 177.—**Wassall** (J. W.) Pyorrhœa alveolaris. Tr. Illinois Dent. Soc., Chicago, 1897, xxxiii, 31–49.—**Williams** (H. L.) Cases of excision of roots. Brit. J. Dent. Sc., Lond., 1898, xli, 152.—**Williams** (J. L.) Scientific criticism and the New York Institute of Stomatology. Dental Cosmos, Phila., 1898, xl, 85–95.—**Wilson** (A.) Resuscitation in emergencies under anæsthetics. Clin. J., Lond., 1897–8, xi, 267–273.—**Winkler** (G. H.) Medicinal prevention of dental decay. South. Dent. J., etc., Macon, 1898, xvii, 17–21.—**Wolffberg.** Retinitis ad maculam durch Zahnaffection. Wchnschr. f. Therap. u. Hyg. d. Auges, Bresl., 1898, i, 145–147.—**York** (E. L.) The diffusibility of coagulants in dentine. Tr. Illinois Dent. Soc., Chicago, 1897, xxxiii, 94–120.—**Znamensky** (N. N.) On the question of the origin of the cuneiform defects of teeth (erosion of teeth). J. Brit. Dent. Ass., Lond., 1898, xix, 8; 85.

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# ORIGINAL COMMUNICATIONS.

## DENTAL EDUCATION FROM A COLLEGE STANDPOINT.

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(Read before Southern Branch of the National Dental Association, at St. Augustine, Fla., February 23, 1898.)

AT the request of your Committee on Dental Education to submit a paper from a "college standpoint," I assumed the task reluctantly, conscious of my inability to discuss the subject as it deserves, and for the additional reason that he who assumes to champion the cause of dental colleges has much of popular prejudice to overcome and contend with, however fair and conclusive his argument may prove. But, of late, so much has been charged against dental colleges, and so little offered in their defense, I assume the rôle of defendant, in the sincere hope that I may be able, in a degree, to dissipate this prejudice and to bring about a more cordial relationship between the discordant factions. And in the outset I desire to assume personal responsibility for what I shall say, for I do not presume to speak as a representative of any college, or to voice the sentiments of the college fraternity at large.

Time will not permit, nor, indeed, is it necessary, that I should undertake to discuss the subject in all of its bearings, but will simply invite your attention to a review of four general propositions, which constitute the ground for the prejudice and opposition already referred to.

The profession at large has drawn up an indictment against colleges in which it is charged—

(1) "There are too many dental colleges;"

(2) "The preliminary requirements for entrance of students are inadequate;"

(3) "There are too many students annually turned loose upon the country;" and

(4) "The colleges are conducted solely from motives of pecuniary gain."

(1) Are there too many dental schools?

We can only answer this question by comparing the number of dental schools with those of other closely allied professions. In the report of the Commissioner of Education for 1895 and 1896, we find that there were in the United States 144 schools of theology, 73 law schools, 155 medical schools, 44 schools of pharmacy, and 46 dental schools; making 98 more theological, 27 more law, 109 more medical, and but two less pharmaceutical schools than dental schools. Have you ever heard any complaint against the number of schools of theology? and yet they graduate annually a greater number than the dental schools. And it must be remembered that but a small percentage of ministers are graduates in theology, there being no law to compel them to attend such schools. Instead of any opposition to them on the part of the ministry, it is a matter of pride and pardonable boast among them that they have such institutions, and where the schools fail to be self-sustaining the ministry rally as one man to their support.

Have you heard of any serious complaint among the attorneys as to the number of law schools? And yet a larger number of law students are annually graduated than dental students. And it must be remembered that only about twenty per cent. of attorneys hold law diplomas,—there being no law to compel them to attend such schools. Every state has its university, or state college, with law department attached. These colleges are more or less endowed by the state, which, of course, makes annual drafts, in the way of taxes, upon every lawyer in the state for their maintenance.

Being more closely allied to the medical profession, we hear occasional complaints against the number of medical schools; but since charlatanry is more openly practiced among them than in other professions, this opposition is natural and amply justified by the facts. I make bold the assertion that the dental profession is responsible for the number of dental schools.

In all dental legislation,—and there is now scarcely a state without enactments for the protection and promotion of dentistry,—special emphasis has been laid upon those desiring to enter the profession. Remove these legal restrictions, and allow the dental student the same privileges as those enjoyed by the legal student, and the dental student will seek the nearest private office for instruction, and but few would avail themselves of dental schools.

A manufactory of drugs and medicines does not increase the number of drug stores, nor produce disease; but it is disease in a rapidly increasing population that renders the manufactory a necessity. The establishment of a dental school does not encourage or increase the number of dental students,—popular opinion to the contrary notwithstanding. Rapid and cheap facilities of transportation have so wonderfully annihilated time and distance as to eliminate them entirely from one's calculations when contemplating a dental education. To illustrate this point, and to emphasize it, we cite the fact that two Southern states send more students to Northern colleges than to the dental colleges in an adjoining state.

Dental colleges exist, therefore, because of a demand; and I sincerely believe I do no violence to truth when I assert unqualifiedly that every self-respecting practitioner, deep down in his conscience, is proud of the fact that there were forty-six dental colleges in the United States in 1895-96.

When charged by the uninformed that no special preparation is required of a student, that we have no literature worthy the dignity to be called such, that we are simply mechanics, how quick would you be to repel the charge, and offer in rebuttal the number of dental colleges we have, the curricula adopted by the same, the percentage required for graduation, and the final appearance of the graduate before a state board! And would you not take pride, also, in refuting the charge, in naming the text-books and current literature of the profession? And the question naturally arises, Who are the authors of our text-books and current literature? With hardly a single exception they were and are college men. Not but that non-college men could have done quite as well, perhaps, but, since we are dealing in facts and not fiction, the truth of history, past and present, demands that we state them correctly.

Take from our literature the products of Chapin A. Harris, Abbott, Gorgas, Taft, Essig, Garretson, Flagg, Kirk, Black, Marshall, and others, and of what could you boast? These authors are or were college men, and with three exceptions are in active college work to-day. As for current literature, the exponents of the best thought and purest aim are conducted by college men.

Before you would hurl your criticisms against colleges and those connected with them, think for a moment what they have contributed to your own present position and future possibilities.

(2) The second indictment charged is, that the preliminary requirements for entrance into dental schools are too low.

In taking issue with this charge, we emphatically declare our belief in the highest possible intellectual attainment as a condition precedent to the pursuit of any professional career. But, we ask, is it fair to exact of dental schools more than is required of other schools of similar character?

The majority of law schools in this country do not require a preliminary standard, nor is there a law or legal board to enforce one. I read you an extract from a letter received from the dean of a recognized leading law school. He says, "There is no requirement of scholarship for entrance into this department." Speaking of the number of students who had matriculated in his school he declared with refreshing candor, "only one has not had a fairly good education, at least as good as the high school can give," and yet this comparatively illiterate student, having pursued the prescribed course of study within one year's time, is awarded a diploma.

Indeed, it is not made obligatory to attend a legal school at all; and about seventy-five per cent. of practicing attorneys avail themselves of three months' study in a private office, when an examining committee declares them thoroughly competent to practice a profession which has been justly esteemed as ranking at the head of all professions.

What do the schools of pharmacy require? The secretary of the State Board of Pharmacy of Georgia, in reply to my inquiry touching the qualifications of matriculates, says, "All of the best schools require a grammar school education, at least, and a few, high school certificates." But it is not necessary that even a student of pharmacy should attend a pharmaceutical school at all. The recently amended law of Georgia—and no one will deny that Georgia is a progressive state—declared that "it shall be the duty of the Georgia State Board of Pharmacy to grant license, first, to druggists who after three years' experience in a drug store managed by a licensed apothecary or pharmacist shall have passed a satisfactory examination before the said Board of Pharmacy."

It will be observed that the student who desires to become a pharmacist is not only exempt from any preliminary requirement, but a diploma as well, provided he satisfies the examining board of his state.

What do the medical schools require of matriculates? A member of the Georgia Medical Examining Board, a distinguished surgeon of my state, writes me, "All medical colleges that are members of the American Association of Medical Colleges, or the Southern Association of Medical Colleges, require a literary standard conforming to that of a second grade teacher's license." Which is about equivalent to a high school certificate.

We thus note that the law schools have absolutely no preliminary requirement, no law to compel students to attend a law school, but on the contrary they can pursue a three-months' course of study and obtain a license to practice.

The schools of pharmacy, and only "the best of them," to quote my informant again, require a high school certificate, and the medical schools have about the same standard.

The dental schools have been operating for the last few years with a high school standard or teacher's certificate.*

Is it possible, in the light of the facts here cited, that the charge in the second indictment can be sustained or justified?

If our sister profession, with such a foundation, can afford to undertake the education of physicians, who may hold your life in their hands, should not dental schools be allowed the same privilege? If law schools can afford to undertake the legal equipment of men for the serious work of advocating or construing the law, with no preliminary requirement at all, should not dental schools be allowed to exist under the present order of things?

Law and medicine, twin sisters of science upon whom civilized society depends, absolutely, for all that makes life worth the living! The one makes and construes the law and defines your personal and property rights, while the other is intrusted to care for that which is the most precious heritage vouchsafed to man,—life. If upon a basis of no education at all, with one, and a high school certificate as a basis with the other, upon which to equip men for such extraordinary responsibilities, is not the present preliminary standard entirely sufficient for a dental education?

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*Or requiring an entrance examination in the absence of such certificates.

In certain quarters the effort is being made to raise even the present standard. In thickly-settled centers of population where all the avenues of trade and professional life are congested, it is possible for dental schools to be self-sustaining; but in less favored sections, where the literary standard of public schools is perhaps not quite so high, it is unfair to attempt to enforce a uniform standard of preliminary requirements.

It is safe to affirm that ninety per cent. of dentistry is purely mechanical. We would respectfully inquire, therefore, to what extent a knowledge of "Greek Classics in English," Cæsar's "Commentaries," Cicero's "Orations," Sallust's "Catiline," Homer's "Iliad," or Xenophon's "Anabasis," would assist the dentist in constructing a bridge, filling a tooth, or treating pyorrhea. We venture the assertion that the men who have contributed the most to the mechanics of dentistry never translated a sentence in the Iliad or demonstrated the hypotenuse of a right-angle triangle.

No one questions the force, power, and elevating influence of education; nor are we opposed to even a higher preliminary standard, but we do affirm the time is not auspicious for its enforcement now. To adopt as a whole the standard required in New York state would, in our opinion, force many schools to surrender their charters and thereby subject them to a loss, which, in all equity, would be manifestly unfair. Let the standard be raised by degrees, year by year, with the addition of a certain course of study which tends to a *practical* training of the mind rather than to a development of *literary* culture. Those who are over-zealous in their efforts to urge sudden and radical reforms on this line, should remember that reforms are not brought about in a day. Rome was not built in twenty-four hours.

The penal system of England, at one period, resisted for years the demand for a reform. Press and pulpit alike were unavailing, it appears, until Reade wrote his well-known novel, "It is Never Too Late to Mend," which proved of such irresistible argument as to finally compel a change in the system.

The schools have not been slow to adopt suggestions for improvement, and while they are not perfect and not entirely exempt from criticism, yet it must be conceded that they have made creditable progress, and have ever shown a willingness to act in harmony with all *reasonable* demands.

(3) The third charge in the indictment—that there are too many students annually graduated, and turned loose upon the country—is equivalent to the assertion that there are too many students studying dentistry.

We note in the authority just quoted,—the report of the Commissioner of Education for 1897, which is the latest report issued,—that for 1895-96 there were 9780 law students, 24,437 medical students, and 6339 dental students. This shows 3441 more law and

18,098 more medical than dental students. To reduce this to its logical conclusion, where, perhaps, the force of the statement can be better appreciated, these figures show one law student to every 7157 of the population; one medical student to every 2864 of the population, and one dental student to every 10,940 of the population. This ratio of the number of students to population is approximately the same as is the number of practitioners to population. Thus, when it is remembered that every inhabitant does not require the constant or even casual services of a lawyer or a physician, but that ninety-nine out of every one hundred do require dental attention, how can the charge be reasonably sustained that "too many students are annually turned loose upon the country"?

But what are the causes for the increasing numbers who seek dentistry as a means of livelihood?

I charge the profession, and not the colleges, as largely responsible for this increase, and there are three principal reasons which conduce to this end:

*First.* The stringent legal requirements of the state laws regulating the practice of dentistry, which make it virtually compulsory upon every student to attend a dental school. These laws have, indirectly, forced the colleges to a higher curriculum, and this higher standard has attracted a correspondingly better educated class of students, who are more solicitous of a respectable professional degree than for its practical or material benefits.

*Second.* The over-crowded condition of other professions has been no mean factor in swelling the number of dental matriculates. The vast number of attorneys who are forced to surrender their legal privileges for the lack of clients, and the meager support realized by the average physician, are sufficient to deter the man who seeks a profession not alone for the dignity of the name, but for remunerative considerations as well.

*Third.* The advent of crown- and bridge-work, with its comparatively large fees, has been and is the most potent and active influence in attracting students to the profession. Every college man realizes the truth of this proposition, as he has almost daily proof of it. The student upon first entering a college is anxious to be initiated,—not into the elements that enter into the primary structure of a tooth, nor into the depths of bacteriology, but into what are to him the profound and sublime mysteries of crown- and bridge-work!

But it is urged by the anti-college element that the number "annually turned loose upon the country" creates competition and a consequent abridgment of their income. While we believe this to be largely imaginary, and not susceptible of conclusive proof, we lose nothing to accept it as a fact, because, if it be true that the struggle for ascendency is greatly accelerated by reason of constant additions to our ranks, dental colleges alone do not stand convicted as the sole and exclusive promoters of competition. It would be a serious reflection upon the intelligence of this assembly were I to attempt to show that every trade and profession, without a single exception, were unwilling martyrs and victims to the saying that "Competition was the life of trade." From the banker to the rag-picker in the streets, competition has been an enemy hard to overcome.

To adequately provide for and to overcome this influx of new bidders for "fame and fortune," what is to be done?

The solution of this problem rests in the education of the masses to a correct appreciation of dental hygiene.

If ninety per cent. of the population are in constant need of dental attention, but only about two per cent. avail themselves of it, no further proof or argument is needed in support of this proposition.

Realizing the urgent necessity for some means by which the public could be enlightened and brought to see the importance of a proper care of their teeth, the last meeting of the Georgia State Dental Society appointed a committee to draft a text-book on dental pathology and hygiene and urge its adoption by the public schools of the state.

In our efforts to disprove the foregoing allegations we have been almost wholly sustained by facts and figures which, to any rational mind, should leave no room for serious denial.

(4) But in our effort to combat the fourth and last charge in the general bill of indictment, in the nature of things, we have no recourse to statistics or very tangible evidence.

To charge that the colleges are conducted solely from motives of pecuniary interest, without proof to sustain the charge, calls for no labored attempt to disprove it upon the part of the defendant, since all rules of law make it incumbent upon the prosecution to prove all charges. We are not disposed, however, to avoid the issue and seek refuge behind a technicality, for we are willing to admit that as a broad proposition, in this very practical age, but few are lending their time and talent without some remuneration; and hence the charge has some foundation in fact. But the writer is cognizant of facts which, fortunately for him, can be unqualifiedly corroborated by testimony which cannot be seriously questioned.

There is no doubt but that in a few instances the organizers of dental schools shared the popular belief that there were millions to be made out of them, and it is possible some have made it profitable. On the other hand there are many, very many, employed in college work to-day who would cheerfully surrender their positions but for financial obligations incurred in conducting the schools, and the sacrifice of professional pride. Be it said to the honor of some, however, that financial considerations are subordinated to a natural desire and special aptitude for teaching. Many find their greatest pleasure and recreation in college work, and it serves as a diversion from the routine of an exacting office practice. Indeed, the writer has personal knowledge of men who are daily sacrificing the income of a large practice in order to gratify their inclinations in this work. When the time lost from one's practice, the expenses incurred in maintaining the college, and the interest upon the amount invested in college equipment are taken into consideration, there is but little if any surplus for ordinary, much less extraordinary, demands.

But suppose the charge in the indictment is true, "is not the laborer worthy of his hire?" Are men engaged in theological teaching alone from religious or philanthropic motives? Are the medical staffs and attachés of the various charitable institutions of the country discharging their respective duties without compensation or hope of material reward? Dental colleges are institutions made possible by reason of a rapidly developing profession. Somebody must conduct them, and that, too, with a remuneration commensurate with the time and labor rendered.

In conclusion, we invoke your sympathy, moral support, and cooperation, in building up rather than tearing down reputable dental colleges. We ask that you put capable, fair-minded men upon your respective state boards who will act in harmony with the schools, but at the same time protect your own interests as well.

Conscious of our imperfect and crude defense, we crave that charity and indulgence which covereth a multitude of faults.

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# FORMALIN.

BY A. S. ESCHELMAN, M.D., D.D.S., BUFFALO, N. Y.

(Read before the Union Meeting at Buffalo, N. Y., October 27, 1897.)

ANYTHING new in the field of dental therapeutics or antisepsis which will help us in combating diseased conditions of the oral cavity will always be received with interest by the progressive dentist. Of late a new remedy, formaldehyd, has made its appearance, which is receiving high praise from physicians as well as dentists as an antiseptic of great value.

Formic aldehyd, or formaldehyd, is a gas, prepared by subjecting methyl alcohol or wood alcohol to oxidation. It is a product midway in the process of oxidation between the alcohol and formic acid. This substance was first discovered in 1867 by Von Hoffmann, who obtained it by passing the vapors of wood alcohol, mixed with air, over finely divided platinum heated to redness. It was considered more or less of a chemical curiosity until a few years ago, when greatly improved methods for its manufacture were introduced and the cost of its production lessened.

Since the discovery of its antiseptic properties by Loew, in 1888, and investigations of Berlioz and Trillat, in 1890, confirming its positive antiseptic properties, it has become a compound of great interest to bacteriologists and chemists. Investigations by the noted chemist, Bayer, point to formaldehyd as the natural protector of the tender parts of plants from bacteria, it being generated by the action of sunlight on the carbonic acid and water of the air, in the presence of the green coloring matter of leaves. Subsequently it becomes the parent of the carbohydrate structure of the plant.

Formaldehyd gas possesses very high germicidal properties, destroying micro-organisms even in attenuated solutions or high states of diffusion.

It is superior to other antiseptics on account of its perfectly neutral character, being neither acid nor alkaline, though at first the pungent odor of formaldehyd is irritating to the eyes and mucous membrane of the nose and throat; these soon become accustomed to it, so it is possible for one to remain for some time in an atmosphere containing a large amount of the gas. The concentrated aqueous solution of formaldehyd, when brought in contact with the skin, acts somewhat like carbolic acid; the skin is rendered insensitive, becomes rough and whitish, no appearance of inflammation is noticed nor pain felt if there are no abrasions or wounds; otherwise a sharp, stinging sensation is the result.

Formaldehyd has the chemical property of uniting with sulfuretted and nitrogenous products of decay, fermentation or decomposition forming other chemical compounds which are antiseptic and sterile, and in the majority of cases these compounds are antiseptic in their nature. It is from this property of uniting chemically with albuminous and nitrogenous products that formaldehyd derives its germicidal powers, and as bacteria and the food upon which they develop and exist is albuminous, formaldehyd is capable of destroying both bacteria and their food supply.

Formaldehyd, being a gas, can readily be vaporized with a suitable generator which is obtainable from druggists. When heated the gas has almost the same specific gravity as the air, with which it readily mixes and shows little tendency to separate. On account of its remarkable penetrating powers, it is the most valuable agent known for disinfecting clothing, etc., penetrating every crevice of a room, floors, folds of beds, clothing, carpets, furniture, trunks, etc., possessing the property of destroying bacteria even in a dry state, promptly rendering the infected material harmless.

Another advantage it possesses over many other antiseptics is that the inhalation of its vapors even in concentrated form, or the accidental drinking of a weak solution, will not result in injury or death; nor will the vapors or solution fade or destroy the most delicate tints of wall paper, paintings, drapery, etc., nor cause rusting or blackening of silver, nickel, copper, steel, or other metallic bodies.

The preparation of formaldehyd that is used is a forty per cent. solution, and goes by the name of formalin. According to Schroeder, formalin has a peculiar influence on the albumen of eggs. The albumen, when placed in contact with formalin, becomes a thin fluid, which does not harden upon being subjected to boiling water for a long time, while the yolk of the egg is converted into a hard substance as if it had been subjected to boiling water. This statement of Schroeder's that formalin prevents albumen from coagulating does not appear to be correct, as I have made several experiments and found that it always coagulated the albumen. What caused me to make the experiment was that I came across an article in the *Pharmaceutical Journal*, where the writer stated that formalin was a delicate test for albumen in the urine, which differed from Dr. Schroeder's statement.

Another property of formalin beside its antiseptic properties is that it hardens animal tissues without changing the microscopical structure and without causing shrinkage.

Dr. Schroeder says, "I have employed formalin in all cases of putrescent pulps, and in a day or two the contents of the pulp-canal are absolutely odorless."

In cases of this kind it is not necessary to remove by any mechanical method the putridity, but merely place a drop of the formalin in the canal. I advise that you be very careful not to bring the agent upon the lips or gums of the patient, as its influence is widespread and will cause the skin to peel off in small pieces. After the canal ceases to yield the fetid odor, wash out the contents with formalin and cement or plaster of Paris. I have employed this method for three years, and have registered no ill effects.

Dr. Kirchoff employs formalin when amputating pulps in bicuspids and molars. When the coronal end of the pulp is exposed he applies to it a mixture of formalin and zinc oxid; then covers this treatment with cement and proceeds to build over all the permanent filling. He has treated teeth thus for some months, meeting with great success.

Dr. J. M. Howe says that a five per cent. solution is the best agent that he has ever used in those cases where the pulp has died and remained in a quiescent state, but when it becomes necessary to open into the pulp he claims that by using a five per cent. solution there is little danger of pericementitis following.

He also speaks in highest terms of the five per cent. solution as a dressing in those cases of pulpless teeth that are so irritable that attempt at closing them causes pain. One application of formalin allows the cavity to be permanently closed. Several cases of this class are recorded by different dentists, where they were treated for a long time without success, but where a few treatments with formalin allowed the teeth to be permanently filled.

Dr. Jack recommends it very highly in exposure of pulps preparatory to conservative treatment. He says, "I have frequently used and have found good results from a five per cent. solution where there had long been caries with a rather broad exposure.

"For recent exposures where the bacterial invasion of the dentin was less, I used a two and one-half per cent. solution. In abscesses with fistula it does not appear to have any curative effects in obliterating the abscess. I have tried a two per cent. solution in two cases without any apparent good effects."

I myself have been using a two per cent. solution as an antiseptic for my instruments for the last three months, and like it very much. It does not blacken nor corrode them. I have also used it in several cases of gingivitis with seeming good results. In using it as a gargle or mouth-wash it should not be used any stronger than a two per cent. solution, as it produces a smarting or rather biting sensation, which only lasts a short time, when the after-effects are rather agreeable. It is better to start with one per cent. or one-half per cent. solution, when it can be increased to two per cent. if desired; but for a mouth-wash a one per cent. solution is sufficient.

One thing in regard to formalin to which I wish to call your attention is its property of hardening animal tissue, and how far this property may be utilized in preserving the pulp-tissue of devitalized pulps. While I am not an advocate of leaving any pulp-tissue or putrescent matter in the root-canals, we all come across cases in posterior teeth, and especially where the exposure of the pulp has taken place from the distal surface, where it is exceedingly difficult to empty the two buccal in the upper and the mesial root-canals in the lower, and can only be accomplished with loss of much time and patience, and then feeling uncertain of having thoroughly treated them. Even if we feel that we have thoroughly removed the contents of the pulp-canal, the next step is where we still oftener fail in being unable to fill them properly.

It is in these cases that, if the statement of Schroeder can be relied upon, and time proves its permanency, formalin will so disinfect and preserve the contents of the pulp-canal without removal and without causing future trouble that a remedy like this will be hailed with delight by the conservative and conscientious dentist.

I know there is only one ideal way of treating pulp-canals properly, and that is by thoroughly removing all pulp-tissue as well as other putrescent material; but as we have to accept conditions as they present themselves to us, it is not always possible to work to the ideal; then we must do the next best thing possible. While we have a lot of good and efficient deodorants and antiseptics, we have as yet to find one that is an ideal one for these conditions. Such a one must have great penetrative or diffusive powers, so as to readily diffuse itself through the pulp-tissue and tubuli without being irritative in its action.

Again, it must possess beside its antiseptic properties the power of combining with animal tissue and putrescent products, so as to form compounds that will not be changed by time to become food for bacterial infection.

# HYPODERMIC LOCAL ANESTHESIA AS PRACTICED IN EUROPE.*

BY DR. PAUL GIRES.

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Though the recent works on local anesthetics and the many physiological and therapeutical experiments have fixed the dosage and methods of use, they are still often employed recklessly and with fear and hesitation. One remembers the many accidents which have too frequently followed the use of these products when they were first introduced, but one does not as often reflect that these accidents were due to the ignorance, imprudence, or to the awkwardness of the operators.

The modern use of local anesthetics must necessarily be submitted to precise rules, which make them entirely inoffensive. Ample statistics in general surgery, as well as in special surgery (dentistry, aural surgery, laryngology, rhinology, ophthalmology, etc.), prove that, intelligently administered, these products may be without the slightest danger. The writer saw very often his eminent master, Professor Paul Reclus, of the Faculty of Medicine of Paris, practice under the anesthesia of cocain very extensive operations. Not only small operations like extirpations of cutaneous tumors, ablations of phalanges and fingers, but also removal of the mammary gland, radical cure of hernia, gastrostomy, and lateral or abdominal laparotomy; these are the daily practice of this surgeon. In about twelve years, Professor Reclus has employed local anesthesia in more than thirty-five hundred operations. This long series, which was not only without one case of death, but without the slightest physiological trouble of the patients operated upon, has thoroughly reinstalled cocain in the position it deserves by reason of its valuable qualities. Its use is now general in Europe, and especially in France. Many general surgeons have followed the example and the precepts of Reclus, and nobody hesitates now to use it in dentistry or in special surgery. But to eliminate the possibility of danger the hypodermic anesthetic must be well and prudently used, and in accordance with precise rules.

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*For a more complete study of this subject, see the clear and precise book of Paul Reclus, "La Cocaïne en Chirurgie."

First, the strength of the solution employed is very important. Many observations have proved that the same dose of cocain is always more dangerous with a concentrated solution than with a diluted solution. The one per cent. solution is now almost exclusively employed in Europe. Its effect is a little less rapid than with a stronger solution, anesthesia being generally produced *only* after five minutes; but the analgesia is always complete and of a long duration. Also, the diffusive power of cocain being very weak, this solution allows one to obtain a well-spread anesthetised field by injecting in the tissues with the same dose of alkaloid a greater quantity of anesthetising liquid.

The position of the patient during the operation is regarded as of extreme importance. He must in all cases be in the horizontal decubitus; fear, the emotion inseparable from the operation, and also the vaso-constrictive action of the cocain, produce a cerebral anemia, which is the cause of the slight or grave troubles which have been so often noticed. The horizontal position of the patient lessens the chances of cerebral anemia. We know that it is not always easy to extract a tooth when the patient is in the decubitus, but the new system of dental chairs makes this position easier, and the dentist can always give to his patient as near the horizontal as is compatible with the success of the operation. In all cases it is advisable to allow the patient to rest in the horizontal position for some moments after the operation.

It is also preferable that the patient should be under the stimulating influence of a nourishing light meal (to which coffee is a good adjunct) while the operation is being performed; but in the case of a small operation, during which only a minute amount of drug is used, this condition is not absolutely necessary.

The hypodermic syringe almost exclusively used for this anesthesia is the Pravaz syringe, which holds exactly one cubic centimeter; when full of the one per cent. solution it contains, therefore, one centigram of the anesthetising drug. On the piston-rod of this syringe is a series of graduations, which enables the operator to have an exact knowledge of the amount injected.

Having detailed these important preliminaries, we shall now describe the technique of the analgesia to be obtained for the extraction of teeth as it is practiced in the hospitals of Paris.

As the analgesia must be obtained by an injection, it is natural first to render the entrance of the needle of the hypodermic syringe into the mucous membrane painless. To accomplish this object a tampon of cotton impregnated with the one per cent. solution of cocain hydrochlorid is applied to the gum over the situation of the tooth to be extracted. It is generally begun by the buccal surface. The patient must be carefully prevented from swallowing his saliva, thus rendering impossible the absorption of the toxic drug by the alimentary canal.

It is necessary to wait about five minutes to obtain a complete anesthesia of the mucous membrane; therefore the operator has the time to prepare the injection. After the ordinary antiseptic precautions, the syringe is filled with the solution and the needle applied to the syringe. To remove the air-bubbles which may be among the liquid, it is sufficient to push out some drops of it, holding the syringe in an upward direction. That being done, and the anesthesia of the mucous membrane being complete, the operator introduces the needle into the substance of the membrane and injects some drops of the solution. Each graduation of the piston-rod corresponds to about one drop of injected liquid. Then push the syringe slowly, at the same time pressing the piston. With this way one obtains a painless injection, the point of the needle being always preceded by the anesthetising liquid. This is also a good way to obtain a complete anesthesia, since the drug is injected in the whole tract the needle has passed through. This tract must be parallel to the root, and extend to a point on the same horizontal plane as the apex; the depth of the needle puncture will thus be seen to depend upon the length of the root.

After having produced anesthesia of say the buccal or labial surface, we next proceed in the same manner on the palatal or lingual, using the same quantity of solution.

The injection must be made very near the root, and begin very near the neck of the tooth, to anesthetise completely the periosteum of the alveolar process. After about five minutes the analgesia is complete; one can then place surely and without hurrying the forceps and extract the tooth without haste. It is not one of the smallest advantages which hypodermic anesthesia confers, on account of its long duration,—viz, ample time to the operator to perform his operation slowly. He can change his forceps if he desires, and is not liable to lacerate the tongue or the gum, or even to fracture the alveolar process, as happens so often in a hasty operation.

For teeth with short roots, or for a loose tooth, a smaller quantity of anesthetising liquid may be used with success.

It is well to remember here that the solutions of cocain used must be always freshly prepared. The aqueous solution of cocain hydrochlorid is rapidly altered, and quickly loses its anesthetising power. Therefore, it is important to always have a fresh solution. An addition of carbolic acid or cherry-laurel water prevents this alteration of cocain, and assists in preserving the drug a little longer; but we cannot recommend confidence being placed in old solutions. It is very easy for the operator to prepare for himself the solution to be used for one or two days. He must have accurately dosed tablets of the drug and a small graduated bottle. For instance, a tablet of one decigram of cocain hydrochlorid is dissolved in ten grams, or, what is the same, in ten cubic centimeters of distilled water. One can add to the solution some drops of carbolic acid, or make the solution with half part of water and one-half part of cherry-laurel water. If the operator prefers to obtain the preparation from a chemist, we advise the following formula:

Cocaïnæ hydrochlorid, 1 decigram;
Aqua destillata laurocerosi,
Aqua destillata, āā 5 c.c.

The same rules and the same doses are employed for the other local anesthetics. We use holocain hydrochlorid more often than cocain. While it has all the advantages of cocain, and has about the same coefficient of toxicity, it has a greater diffusive power. This last advantage is a great one when it is necessary to have a widely anesthetised field, as, for instance, in the case of the extraction of two adjoining teeth.

It is a question whether the hypodermic local anesthesia has an effect on all the tissues. It is undoubted that the anesthetic effect is very much less on a necrotic or an inflamed tissue. Also, an injection in an alveolar abscess distends the walls of its cavity and produces great pain; therefore, subcutaneous local anesthetics would not be advisable in such a case.

Although the solution that we prefer to use, and which is almost exclusively accepted in the principal medical centers of Europe, is the one per cent. solution, some surgeons, however, still use a stronger solution,—three, four, or even five per cent.,—but they use a smaller amount of their solution. They claim that they very seldom have accidents, and even if they do occur they are always of very slight importance. Those accidents, though very slight, though "insignificant," as an eminent Austrian physician once said, are nevertheless always disagreeable, especially in a private office. We know that indispositions occur sometimes in the cases of extraction without anesthesia. The fear of the apparatus of instrumentation can even produce faintness on a nervous patient; as a proof of which we quote the case reported by our distinguished friend, Dr. Hugenschmidt, of Paris, in which an injection of some drops of water without any drug produced a long syncope on a hysterical woman. But we think it useless to increase the chances of accidents of that kind by using strong solutions.

The advantage claimed for strong solutions is the more rapid effect of the drug. It seems to us that this advantage is a very small one, for with the method here advocated we have always obtained a complete anesthesia five minutes, and often four, and even three minutes, after the injection. Why should the surgeon, in order to save one or two minutes, expose his patient to even the most insignificant disagreeable feeling?

We have also been told that sometimes the anesthesia is not so complete with a weak solution; that the patient, though having no pain, still feels that the operator is doing something to him. Where is the objection, if the operation is painless? What we wish is the analgesia, and the complete anesthesia is not necessary. Moreover, that restriction is far from being a rule.

In any case, the solutions stronger than one per cent. are not at all advisable, and every solution stronger than four or five per cent. is absolutely condemnable.

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# IS DENTAL CARIES ACCOMPANIED BY INFLAMMATORY ACTION?

BY DR. C. S. BECK, WILKES-BARRE, PA.

(Read before the Union Meeting at Buffalo, N. Y., October 27, 1897.)

THE idea of life in its simplest acceptation is that of vital activity, and obviously, therefore, involves that of change.

We do not consider any being as alive which is not undergoing some continual alteration, however slow and obscure, that may be rendered perceptible to the senses. This alteration may be evidenced by growth of the organic structure, or by molecular changes in its substance which do not produce any ostensible increase; or it may be most obviously manifested in movements such as cannot be attributed to any physical cause.

The life of any complex organism, such as that of man, is in the fact the aggregate of vital activity of all its component parts, and no fact has been more clearly ascertained by modern physiological research than this. In every living structure of a complex nature, while we witness a great variety of actions resulting from the exercise of the different powers of its several component parts, we at the same time perceive that there is a certain harmony or co-ordination among them all, whereby they are all made to concur in the maintenance of the life of the organism as a whole; and if we take a general survey of them with reference to their mutual relation, we shall perceive that they may be associated into groups, each consisting of a set of actions which, though differing among themselves, concur in effecting some positive and determinate purpose. These groups of actions are termed functions.

In the present advanced state of anatomy, physiology, and histology every shadow of doubt as to the human teeth being living organs has passed away. We see nature very early in uterine life making provision for the development and growth of the teeth. We see, too, that they are connected to the general system, and derive their nutritive supply, like all other organs of the body, from the circulation of the blood.

If these physiological facts be true, may not the teeth be subjected alike to some of the diseases which other organs are heir to? From the material supplied in the food there is prepared by the digestive and assimilative process the blood. Upon the circulation of the blood through all parts of the fabric depends the nutrition of the tissue.

Disease is a state opposite to that of health, consisting in a change either in the position and structure of parts or in the exercise of one or more of their functions, or in both. If any one of the organs or tissues of the human body be irritated, it is occasioned by some stimulus, which stimulus causes an increased flow of blood into the capillary vessels; these vessels become over-dilated and enfeebled, the results of which are pain, redness, heat, tenderness, and swelling. These symptoms will appear in greater or less severity, according to the structure, vital properties, and function of the parts affected and their connection with other parts, as well as according to the constitution of the individual; this we call inflammation.

The predisposing causes of inflammation are the same as those arranged under the head of predisposing causes of disease,—viz, debilitation, influence, excitement, previous disease, present disease, hereditary constitution, temperament, age, sex, and occupation. Local causes of inflammation comprehend irritants, whether mechanical, chemical, or vital. A grain of sand in the eye, a thorn in the skin, or a wound in the flesh, are some of the mechanical irritants; chemical irritants are such agents as operate on living matter by strong chemical affinity and tend to alter or decompose it. Heat, strong acids and alkalies, various salts, etc., such act in like manner on dead texture.

Vital irritants are various agents which produce no effect on dead animal tissue, and whose irritating operations are not referable to any known chemical property; of this kind are cantharides, mustard, capsicum, and the essential oils.

If the web of a frog's foot be placed under the field of the microscope, so as to bring to view the circulation, and one of the essential oils be applied, the following phenomena present themselves: The red corpuscles of the blood lose their circular form and adhere together; the white corpuscles remain apart, and are often more abundant than usual. This is inflammatory action. If the cellular or serous membrane be affected, the inflammation is more active than when the mucous membrane or skin are affected. Inflammation may end by resolution, suppuration, gangrene, adhesion, effusion, or induration. For instance, when the effusion takes place between the bones and periosteum it may terminate by absorption, or be converted into pus, or become organized into fibrin and the fibrin into true bone.

Caries of the bone is an inflammatory process called osteitis, and has its origin in the soft parts of the bone, and erodes its hard tissue; but in the tooth the carious process has its beginning in the hard tissue and spreads to the more vascular, the dental pulp. The human tooth has entering into its formation the following tissues: the pulp, dentin, enamel, and cementum. The pulp occupies the center of the tooth, and consists of a rich plexus of blood-vessels and nerves, held together by connective tissue. Covering the periphery of the pulp is a layer of cells called odontoblasts; passing from these are processes, some of which enter the canaliculi of the dentin, and some pass laterally to connect with other odontoblasts, while others connect with cells which lie more deeply, and are called pulp processes.

The dentin is an organized matrix highly impregnated with calcium salts; traversing it are innumerable canaliculi, which have their origin in the pulp-chamber and ramify in every direction toward the enamel and cementum. Each of these tubes is occupied by living fibers; these ramify and pass through the walls of the canaliculus into the basis-substance, forming a net-work of living matter and anastomosing freely through the dentinal tissue.

The cementum is traversed by cavities which contain nucleated bodies similar to the Haversian canals found in bone; from these nutritive cells are sent off delicate branches which anastomose freely in the basis-substance with those sent off by the dentinal canaliculus. In the enamel we also find living matter in the form of very delicate fibers; these send offshoots into the cementum. We have a complete plexus of living fibers in all the tissue of the teeth, and they ramify freely one with the other; then the tooth, as a whole, is connected with the jaws by the periosteum which invests its roots.

We must then admit the tooth to be a living body, and that it is subject to any morbid process which will react upon the living matter of the tooth, just as on any other tissue of the body.

Dental caries has been the subject of much thought and study among some of the talented and ablest physiologists and pathologists both of this country and Europe. From the days of Hippocrates up to the present time several theories have been advanced as to the cause of dental caries.

Hippocrates and his pupils were humoral pathologists, and hence they referred caries to a bad condition of the humors. These views were held for over a thousand years. Fauchart took a great deal of pains to discover the worms supposed to be in most cases of decay, but never succeeded.

Hunter, with his false physiological views, regarded the teeth as foreign substances in a certain degree, and they only received nourishment when sound and fit for use.

Fox considered the proximate cause of dental caries to be an inflammation in the bone of the crown of the tooth, which, on account of its peculiar structure, terminated in mortification.

The present theories are the vital-chemical, the electro-chemical, and the parasitical. To enter into a discussion of these several theories would be foreign to this paper; suffice it to say that to-day, in spite of all the researches which have been made, we are not clear upon this subject. One thing we do know, that death of the dental tissue is preceded by their decomposition. We know that one condition has occurred by the presence of the other. We also know that the human tooth is a living organism, that its connection with the general economy is similar to that of other organs. It is supplied from the circulation with blood. Its pulp-tissue is a rich mass of blood-vessels and nerves. From its protoplasmic bodies pass fibers which traverse its entire structure. That these are facts favorable to inflammation, when subjected to irritating causes, I think cannot be denied. We have seen that the degree of inflammatory action depends on the condition of tissue affected. How do these living fibers which pass into tooth-tissue induce the flow of blood, or some other fluid which carries the calcifying material and deposits it at the line of demarkation, which is to be found in all teeth affected by dental caries? This barrier is situated between the pulps and devitalized dentin. We are told that it is produced by the consolidation of the canaliculi of the first line, which being destroyed by the advancing disease, a second is thrown up, and one after the other until the pulp-tissue is reached, and it in turn becomes subjected to irritation and inflammation which induces it to renew its formative function; this is what we hope to bring about when we cap an exposed pulp. This vital act, this self-protective principle, does seem to be accompanied by more or less inflammatory action. May it not be possible that this line of separation between the dead and living is a fact similar to that which takes place in other tissues of the body, and which the surgeon sometimes waits for before operating? May it not also be analogous to that which occurs in the soft tissue when inflammation advances toward abscess?

When the devitalizing of an exposed pulp was a common practice, we frequently saw the dentin colored red. The view then entertained was that the blood-corpuscles were broken up, and hemoglobin or coloring matter of the blood was liberated and passed into the tubes of the dentin. In former years I have frequently met with teeth colored in this way. In some instances the discoloration would pass off in from twenty-four to twenty-eight hours, but in many cases become permanently fixed. We have merely a hypothesis as to the true cause of discoloration. Those of you who have seen the circulation of the blood in the web of a frog's foot noticed that the blood-corpuscles do not always retain the spherical form as they pass along the vessels; their figures sometimes become elongated or contracted in the center as they pass around the corners, so to speak, or pass from one vessel to the other.

At what point in the capillary system the arterial blood is converted into serous, or the arterial blood gives off its nutritive properties, is not known. We know the pulp is abundantly supplied with blood-vessels and nerves. Now, if the line of demarkation found in the teeth affected by caries be the product of a deposit of lime-salts in the canaliculi, how, and by what means, are these salts carried to the line of demarkation? Is there any other vehicle but the blood to convey them?

Histology is only in its infancy, as connected with dental anatomy. To-day we admit of living matter in the dentin, cement, and enamel. With these truths in view, may it not be reasonable to suppose that dental caries, in part at least, is accompanied by inflammatory action?

Every dental operator knows that there is such a thing as sensitive dentin; if he doesn't, his patients are not long in informing him of the fact. What is the pathology of sensitive dentin? When our patients ask, What is it that hurts so? the reply is, Sensitive dentin. And pray tell me what is sensitive dentin? Some authors tell us that it depends upon its connection with the pulp, and others that there is a possibility of actual nerve-fibers. If you admit one of these theories there is a possibility of an artery, for nerve and arteries accompany each other. If you admit the one I do not see how you can omit the other. If you acknowledge both, you must admit of inflammation. We sometimes meet with cases in which caries has been arrested, and the parts, though dark, have become hard, consolidated, and highly polished. We might ask how this change is brought about. Is it that the vital parts have overcome the destructive agent? If so, has it not been preceded by an inflammatory action? A more common occurrence in practice is to meet with cases in which the teeth are worn down quite to the margin of the gums, and without any pulp exposed. The pulps in these cases have resumed their formative power and deposited new dentin. This, I think, is due to more or less inflammatory action.

In teeth of delicate structure, and particularly those in which the tubuli are large, a considerable amount of pain is felt upon the removal of the disorganized tissue. Teeth that have been excavated and their tissue left exposed to the action of the secretions of the mouth in a short time become painful and highly sensitive to the slightest touch. These are conditions common to inflammation. Pain is frequently felt in the progress of dental caries long before the pulp is exposed. A number of patients are able to tell when their living teeth are decayed, from the unpleasant sensation which they feel. In these, then, do we not have nearly if not quite all the symptoms accompanying inflammation? The severity of its action depends upon the quality of the tissue and the state of the system, whether it be above or below the standard of health.

These are some of the causes which lead me to believe that dental caries is accompanied by inflammatory action.

## MATRIX CONTOURING.

BY JULES J. SARRAZIN, D.D.S., NEW ORLEANS, LA.

(Read before the Louisiana State Dental Society, February 23, 1898.)

A PERFECT filling is one the retention of which in the cavity is strong, the adaptation of which to margins is absolute, the shape of which is such as to best aid mastication, and, at the same time, allow the least ingress and the easiest removal of food-stuffs from approximal surfaces.

Needless to say that the edges and margins of the filling-material must be finished smooth as glass, and in no case protrude beyond or lap over those of the cavity. Needless to add that the approximal surface of such a filling, for the sake of the surfaces of contact of adjoining teeth, must be left smooth enough to invite the exit of any food that may enter during mastication. So few, indeed, such operations do we see that anything tending to facilitate them should be a boon to profession and patients. So many otherwise fairly good fillings fail because ideation has not presided at their shaping and knuckling. The trend of the age toward scientific production demands calculation of all factors of success and failure, and dentistry, progressing as it does, cannot be content with less thorough or thoughtful productions.

The great number of matrix systems published, advertised, and demonstrated, bear witness to the utility of the matrix, both in adapting and shaping. These systems, however, are more or less faulty. Their chief defect lies in the fact that they do not give perfect shape, combined with contact of matrix at the gingival margin, and just enough yield to assure perfect adaptation at wall edges with the least possible amount of after-polishing.

If necessary cutting, shaping, and polishing were alone to be avoided, it would be cause sufficient to spend some time and ingenuity in constructing a filling mold that would attain this object. At the termination of a long, tedious operation is where the patience and energy of the operator fails, and where the patient prays mercy. It is where future failure creeps, on the wings of sentiment or fatigue, or with lack of energy and conscience, if not knowledge.

Of all these evils we can steer clear. It takes a little judgment, a little care, and a little patience. That is all. After having first studied the occlusion, apply the dam. Prepare the cavity not for the present, but for the future,—with sufficient retention in different directions so that filling repair shall be possible and safe in years to come if ever necessary; and shun frail edges and weak walls where study of the occlusion had shown them to be unsafe.

Occlusion should always be carefully studied before even the dam be applied, and before a single instrument be used. This avoids hesitation as to what walls to retain or remove, precludes error, and scarcity or excess of filling-material. When cavities are of large size and depth, and walls frail, these need not be weakened by undercutting or grooving. Adhesive cement, covering all the inside of the cavity, but about one-thirty-second of an inch all around the peripheral inner edges, and shaped so as to offer strong retention, will strengthen the tooth, protect the pulp, prevent discoloration if amalgam be used, and retain the filling securely. Cement thus used should be allowed at least twenty-four hours to set before gold building be started.

Whatever course has been pursued we now have a compound cavity, approximal and occlusal, or worse, ready for gold filling. Take a composition silver strip, the width of which is slightly less than the height of the tooth without its cusps. Fit this strip around the tooth, and bend its ends at right angles where they meet. Remove, solder over an alcohol or gas flame with soft solder; cut off the excess and shape the seam so that it will not injure the gum or cheek. At this point it is good practice to thoroughly sterilize cavities. Now slip to place the ferrule just made until it overlaps the gingival margin of the cavity, burnish it tightly on this margin, especially so if there be a depression at the approximal cervix of the tooth such as we often find at the origin of roots of bicuspids or molars. Pack gutta-percha at that portion only, and no more, between the adjoining tooth's approximal neck and the matrix, so as to absolutely maintain the adaptation. This done, burnish out your matrix from the cavity, making quite sure in so doing that you prevent its closing over the cavity edges; and burnish out until you have restored all the contour desired. Gutta-percha must now be packed, carefully and soft, well in between the matrix and adjoining tooth even with the edge of the matrix, and extending buccally and palatally to about one-quarter of these surfaces of both teeth, and well over all cavity edges.

We have thus built a mold of exact size and shape for the filling desired, and so rigid that the pressure of gold condensation can make it yield only just enough to assure perfect adaptation of the filling at the wall edges, but allowing of no overshaping of contour.

We have reduced a compound cavity to the shape of a simple one, in so far as filling is concerned, and in so much have facilitated the work. In a mold thus constructed any form of gold may be used; cylinders laid horizontally and keyed vertically, soft foil tape, cohesive foil, pellets or mats, or plastic preparations of gold, or a combination of any of the above may be made with the same ease and with equally good results as to shape and contour. Care must of course be given to perfect packing at the angles formed by the cavity edges and the matrix. This is the important point on which hinges success. The rest will almost take care of itself. This system requires sufficient space between teeth, of course; all rebuilding and perfect contouring does.

Desired space can almost always be obtained with perfect comfort to patient, provided made slowly and gradually enough. A rubber strip one-fortieth of an inch thick is enough to start with, to avoid irritation of the socket membranes. Gradual wooden wedges best follow. Cotton packing is sure comfort where practical. Where an amalgam contour is to be made, the same matrix will apply by sticking its ends with hard adhesive wax, instead of soft-soldering them. Amalgam that will not bulge is the one containing so little mercury that it would crumble rather than spread under pressure, and therefore requires a mold to be packed in. The wax soldering facilitates the removal of the matrix by the use of little heat, without disturbance of the amalgam.

The amalgam matrix should reach the proximo-occlusal angles of the tooth. The gold matrix should be a little short of these angles to facilitate access to undercuts of cavity. In gold building of incisors reach is sometimes difficult approximally, especially after some packing over cavity edges, and much excess of filling results which could be avoided by a matrix of this kind extending somewhat shorter than for bicuspids and molars.

# PROCEEDINGS OF SOCIETIES.

## New York Odontological Society.

A regular meeting of the New York Odontological Society was held at the New York Academy of Medicine, No. 17 West Forty-third street, on Tuesday evening, January 18, 1898, at 8 o'clock.

The president, Dr. S. G. Perry, occupied the chair, and called the meeting to order.

### Incidents of Office Practice.

The President. I will call upon Dr. Darby to present some teeth filled with tin foil,—a very interesting collection,—showing what can be done with that foil. The work was done by students.

Dr. Edwin T. Darby. Mr. President and gentlemen, I did not intend saying anything about these tin fillings which you are examining. I merely brought them over that you might see what the freshmen in our dental department are doing in the technique laboratories. The demonstrator who has charge of that department brought me a great number of little boxes filled with specimens of the students' work in tin filling, and asked for my opinion as to its merits. You will bear in mind that this is the work of the *freshman* class,—men who came to us perfectly green and inexperienced in the use of dental instruments on the first day of October last. This is the result of three months' work. We have in the freshman class one hundred and seventy-five students; these are equally divided into classes, and they spend a certain number of hours each week in the operative technique laboratory under a demonstrator, who instructs them in the preparation of cavities and filling the same with tin. They also have, under another demonstrator, instruction in modeling with clay and plaster. I have always felt, as some of you may know, that tin is a very valuable filling-material. I have used it more or less during the past thirty years, and I know that your president has used it equally long. Only last week I saw some tin fillings of his inserted in the mouth of a child at least ten years ago. She has been coming to me semi-annually for eight or ten years, and each time that I examine her teeth I pass those tin fillings over as being too good to remove. No other material could have saved those teeth better than tin has done.

Tin certainly possesses some desirable qualities, but it also has some undesirable ones. Its color is inharmonious, but who ever saw a tooth discolored from a tin filling? Its non-conducting quality renders it one of the best materials to put in contact with sensitive dentin. Even though it be in close contact with the pulp, I prefer it to gutta-percha or zinc phosphate in such cases. If we were to insert more tin in the bottom of large cavities, and then cover it with gold, there would be less disturbance of the pulp from thermal changes.

The PRESIDENT. I will ask Dr. Palmer to read a letter just received from Dr. Shumway, which bears upon this subject.

Dr. Palmer, the secretary, then read the following letter:

"PLYMOUTH, January 16, 1898.

"*Dear Doctor,*—I have your kind invitation to meet with the Odontological Society on Tuesday evening next. It would afford me much pleasure if it were possible for me to be present. If agreeable to the society, I would like to give another clinic on tin and gold at some future meeting. I am disappointed that the clinic I gave last winter did not succeed any better. I think but few tried the method, and those with results so indifferent as to cause them to abandon its use. Recently I have made a new discovery in relation to the manipulation of tin, which makes the operation so easy and simple that no one need fail who has ever studied the nature of metals, with a view to using them in filling teeth. I believe the combination filling such as I am putting in now is a perfect substitute for lost tooth-structure,—the most perfect substitute for lost tooth-structure that was ever put into the mouth. Combined with this is ease of manipulation such as never entered my dreams. I wish now I might live my life over for the pleasure of filling teeth. For more than thirty years it was an irksome task; now it is a delight. A patient remarked to me the other day when leaving the chair,—a patient who has had much experience in having teeth filled,—'I know *that* is a good filling.' I asked her why she said that. She replied, 'Because you put it in as though you loved to do it.' Excuse me, but the brothers are not 'in it,' if they do not use tin and gold manipulated by simple contact. I have written at greater length than I intended, but the kindness of your invitations in the past prompts this acknowledgment.

"T. D. SHUMWAY."

The PRESIDENT. I hope we will soon have the pleasure of seeing Dr. Shumway and hear him personally explain his method.

Dr. WILLIAM JARVIE. I want to add my word as to the value of tin foil as a filling-material, particularly in the teeth of young people, in the class of cases in which the fillings do not show, such as the first and second molars, where I do not want to use amalgam on account of discoloration of the dentin, and where the child's jaw is hardly strong enough to bear the pressure necessary to condense gold. Tin, while a pure material, is much softer than gold, is easily adapted to the walls of the cavity, preserves the tooth-substance perfectly, and in a good many cases cavities can be filled with it to preserve the teeth and last until the child is seventeen or eighteen years old, when the fillings may be replaced by gold. The tooth in this manner may be preserved perfectly, and I think a service done to the child that could not have been done with any other material.

Dr. S. C. G. WATKINS. What instruments does Dr. Jarvie use in these tin fillings; deep serrated ones?

Dr. JARVIE. I use exactly the same instruments that I use for gold, and I prepare my gold in the form of pellets. It is a way of my own, perhaps no one else would like it; but I prepare my tin foil exactly as I prepare my soft gold, and work it in the same manner and with the same set of instruments.

Dr. G. W. WELD. I would like to ask Dr. Jarvie if he inserts large compound fillings of tin foil in bicuspids or molars, similar to the one I hold in my hand. Is it possible, in other words, to do so in the mouth and make a practical filling?

Dr. JARVIE. I know it is possible, for the proof is in your hand; but I do not think it would be a useful filling in the mouth, and I imagined that these were done by the students simply to learn the craft of working foil, either tin or gold, into such forms as that. I should never make compound fillings of tin and expect service from them; the material is too soft. The cavities which I fill with tin foil are what we term simple cavities; that is, with a wall entirely or almost surrounding them. One word further in regard to the usefulness of it. A lady about twenty years of age, with beautiful teeth, was in my office this afternoon; there were several tin foil fillings in them which I had inserted when she was eight years of age, and I saw no excuse for disturbing one of them. They were all doing very good service.

Dr. WELD. I must confess that this is the most beautiful work I ever saw, so far as tin filling is concerned. I never supposed such fillings could be built up, even out of the mouth, as beautifully, and it certainly is a credit to the students, as well as to those who have charge of the clinic. But in the mouth it seems to me such work is an impossibility. I have always supposed that tin was non-cohesive, and could be used only in cavities of a retentive form; but if such large contours can be made in the mouth I think it is most remarkable.

Dr. JARVIE. Fresh tin is as cohesive as gold.

Dr. J. F. P. HODSON. You do not mean foil?

Dr. JARVIE. I mean that tin can be packed one layer upon another, just as cohesive gold can be. Dr. Darby five years ago brought on some samples of tin that proved that.

Dr. HODSON. But that was not foil.

Dr. JARVIE. That was freshly cut shavings from block tin; but contour compound fillings, such as we have seen to-night, may be made with the S. S. White No. 4 tin foil, which is as cohesive as the ordinary cohesive gold foil.

Dr. DARBY. I think there is no question at all about the cohesive properties of tin. I have built an entire crown upon a tooth out of the mouth, to show the cohesive properties of tin. The tin used in the college is made by The S. S. White Dental Manufacturing Company, and is known as No. 4 in thickness. It is prepared by taking a third of a leaf and rolling into a loose rope, and then cut into pieces one-quarter or one-half inch in length; or a third of a sheet is folded once or twice and then cut into narrow strips. The students work it precisely as they would cohesive gold foil, relying upon the cohesive properties of the material. These contour fillings are made with the same instruments that would be used in packing gold foil.

The PRESIDENT. Dr. Darby will now demonstrate Dr. Jenkins's system of porcelain inlays.

Dr. DARBY. Porcelain inlays are not new, and yet the system which I shall describe to-night is, I think, new to most of you.

There have been times, I doubt not, when each of you has felt that he would like to have something different from gold, different from amalgam, and different from the plastics for certain cases,—something harmonious in color, and possessing lasting qualities. Efforts have been made to insert nicely-fitting fragments of porcelain teeth, and with a degree of success; but such operations entail an enormous amount of time and patience on the part of the operator, and in the end are not always satisfactory; hence that method of making porcelain inlays has been considered, in the main, rather impracticable.

Some years ago Dr. W. Storer How, of Philadelphia, invented a method of porcelain inlays which, for simple round cavities, answered a very good purpose. As you are all doubtless familiar with his method, I will not describe it.

Mr. Dall, of Glasgow, has invented a very complete system of porcelain inlays, and has shown great skill in adapting his method to cavities of irregular shapes. These inlays are made by Messrs. Ash & Sons, of London, and are of a material which can be ground and polished after the same manner as their porcelain teeth, but even then much labor and time is consumed in the fitting of these inlays.

Then came the glass inlays, which were made in a mold taken from the cavity. Such inlays were fused at a low degree of heat, but they were worthless because they soon lost their gloss and disintegrated, and after a short time presented a very unsatisfactory appearance. The glass inlays, therefore, have been a disappointment, and practically a failure. The glass inlays suggested to Dr. Jenkins his method of making porcelain inlays.

Dr. Jenkins, as many of you are aware, is an American by birth. He was from the state of Maine, and went to Dresden about thirty-one years ago. Possibly some of you know him personally. It was my pleasure, in company with Dr. McQuillen, of Philadelphia, to spend nearly a week with him in his own home last summer. Living in Dresden, where the porcelain art has reached a high degree of perfection, and adjacent to Bohemia, where also both glass and porcelain art work are manufactured, he has had exceptional facilities for perfecting his system of inlays, and he has expended an enormous amount of time and energy upon it. I have brought with me the various appliances used in making these inlays, and I will endeavor to show you how they are made and inserted. I may not be able to make a perfect one by gaslight, but I will do the best I can under the circumstances.

You will observe that the apparatus consists of a little sheet-iron furnace which is lined with asbestos. A Melotte blow-pipe mounted on two little tripods, with the mouth of the blow-pipe looking upward instead of downward; a foot bellows, and the porcelain of various shades in powder form. These constitute all the apparatus required. The cavity is first shaped *not* retentive in form, as where gold or other metallic fillings are to be used, but after such manner that an imprint or mold may be made of it. For this purpose No. 30 rolled gold is used, much after the manner practiced in glass inlay work. If the cavity be between the teeth, a piece of gold somewhat larger than the cavity is carried well above the cervical border of the cavity, and held there with an instrument in the left hand, while with the other hand a pellet of paper or spunk is used to press the gold into the cavity. The method which I have adopted to carry the piece of gold above the cervical border of the cavity is to turn the edge of the gold over upon itself about a thirty-second of an inch, and then slip a piece of floss silk under the edge of it. By this means I carry the gold and floss well above the cervical border, and then tie it around the tooth. This holds the piece of gold where it is wanted, while I press the piece into the cavity. When it has been well fitted to the interior of the cavity, I then cut the floss near the gum and pull it away. The piece of gold is then carefully removed from the cavity and the edges trimmed, and again placed back in the cavity and burnished until it has been made to fit thoroughly. It is then removed and placed in an investment of fine asbestos mixed with water. The little cup which holds the asbestos investment is made of platinum and connected to a wooden handle, which enables one to hold it in the hand during the baking of the inlay.

The investment is then partially dried over the flame of a spirit lamp or Bunsen burner. The porcelain powder is then mixed with absolute alcohol upon a glass slab, or watch glass, to a pasty consistence. The gold impression is then filled and heated in the little furnace by means of the blow-pipe. Two or three fusings are usually required before the necessary contour has been attained. A little practice will enable one to know when the inlay is of the proper size. After the final baking the inlay is removed from the investment, the gold stripped from its under side, and it is tried in the cavity. If it be found to fit perfectly, it is then grooved on either side with a diamond disk, that the cement which is used in the final setting may have additional hold. The cavity is then made retentive in shape by making slight grooves or undercuts, after which some of the quick-setting zinc phosphate cements are used to hold the inlay in place. It is desirable that a cement harmonious in color be used. I have found the Harvard cement best for this purpose.

It was my privilege to see Dr. Jenkins make quite a number of these inlays and insert them in the mouth. Some of them were in approximal cavities in the oral teeth, and they were beautifully done. At a little distance from the patient one would not be able to distinguish that the teeth had been operated upon, and in no instance were they objectionable in appearance. I was charmed with the method of filling compound cavities in the bicuspids and molars, and the method was equally desirable for occlusal surfaces. When treating the very large cavities on occlusal surfaces my method has been to grind the cavity into shape with a coarse corundum point, leaving it somewhat saucer-shaped. In cavities of this form there is little difficulty in getting a perfect impression. When the inlay is ready to cement in place, slight grooving is all that is essential to hold it in position.

You may ask, "Is this a time-saving method of filling teeth?" I answer "yes," after one has had a little experience in making the inlays. It may not be so the first few times it is done by one unaccustomed to it, but the length of time required to bake the inlay is not as great as that required in packing gold into large cavities, and the strain upon the patient is vastly less. In fact, it makes the operation quite a pleasant pastime for the patient when compared to an hour's malleting.

### *Discussion.*

Dr. A. L. NORTHROP. I would like to ask Dr. Darby if the gold ever fuses?

Dr. DARBY. I could conceive that it might fuse if pretty hot, although I have never melted the gold when making one.

Dr. NORTHROP. What is the advantage in the use of gold over platinum?

Dr. DARBY. It is more malleable, more easily shaped to the cavity.

Dr. VAN WOERT. Do they never change color?

Dr. DARBY. These did not. The glass inlays always change color.

Dr. J. BOND LITTIG. All the porcelain inlays I have tried have changed color. That has been the trouble with them as far as I have used them. All the porcelain bodies that I have used, that would bake on gold without fusing it, always changed color.

Dr. JOHN I. HART. In porcelain inlays, particularly low-fusing ones, such as the glass bodies that were furnished us a few years ago, I think the porosity of the resulting inlay was very unfortunate, as it discouraged many of us from doing further work in that line. We will also suffer from the fact that, owing to the margin being not as well protected with the porcelain inlay as it is with the gold filling, there is apt to be a disintegration at that point. I would like to inquire from Dr. Darby what his experience has been.

Dr. DARBY. My experience has not been long enough to judge, but Dr. Jenkins says that he has not found it so.

Dr. WATKINS. How long a time has Dr. Jenkins found those inlays to last?

Dr. DARBY. Four years. He told me that some he has recently seen were perfectly good; no change in them.

Dr. JOHN I. HART. I think, Mr. President, that this little model that I will pass around would be of interest. It indicates to what point we may carry a porcelain point or contour. That was put on a tooth which had a vital pulp, and two pits drilled in, avoiding pulp, as was indicated in some remarks made by Dr. Littig some years ago. When the holes were made as far from the pulp as possible, platinum pins were fitted and a platinum backing burnished to position, furnishing a thin sheet of platinum against the body of the tooth, to which the pins were united. Back of that was a porcelain body that was cemented to position after it had been baked, and it has remained on that tooth for a couple of years.

The pulp is still alive, and the restoration has withstood the strain of mastication very well. The surface of the other teeth indicates how close the bite is. But the fuse there was a high fuse, such as is obtained for continuous-gum work, and consequently I had confidence in it; but from the low fuses I am pretty sure that we will get disintegration, particularly if any of the margins are sheltered.

Dr. O. E. Hill called the attention of the society to an article by George Byron Gordon in the January number of the *Century Magazine*, entitled "The Mysterious City of Honduras," in which was detailed the ancient use of jadeite as a material for making inlays, which were inserted, for ornamental purposes, in the teeth by some of the natives of Copan.*

Dr. Jarvie. Mr. President, in listening to the essayist of the evening it would seem almost as if a dental millennium had arrived, when there would be no need for disfiguring amalgam fillings or large plugs of gold; that porcelain would take the place of both, and make partially broken down and decayed teeth things of beauty. This is what our patients have been talking to us about for years,—to find that wonderful filling-material which shall be as translucent as the structure of the tooth, and of the same color,—and as I have been listening to-night I have not heard anything that should prevent us from going home and practicing making these porcelain inlays in our laboratories, and in the course of a few weeks try it in practical cases in the mouth.

I will get an outfit for this work, if it can be had, and experiment with it in the laboratory so as to attain a certain amount of manipulatory skill before attempting it upon teeth in the mouth. If this porcelain will stand the force of mastication and the fluids of the mouth, cause no disintegration, and the margins of the cavities retain their sharpness and edge, which I consider a very important matter to be decided with these fillings, I am sure we have secured something that has always been a desideratum. I feel very greatly indebted to Dr. Darby for his kindness in coming on from Philadelphia and bringing all these materials with him. His description of the development of this porcelain material, from its first inception up to the present time, was exceedingly interesting, and Dr. Jenkins must have spent an immense amount of time and money. He can never get any money return which will compensate him for his labor, but he must accept his compensation in the assurance that he has given to the dental profession one of the greatest boons that we have yet received, if it proves to be as valuable as it would seem to be.

The secretary then read the following extract from a letter from Dr. Ottolengui:

> "As one of the few men in this country to whom Dr. Jenkins has given his new method, perhaps I may say a few words that would be of interest, if you would care to have this letter read.

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*This use of jadeite was previously reported in the Dental Cosmos for October, 1893, by Dr. R. R. Andrews, of Cambridge, Mass.—Editor Dental Cosmos.

"First, let me say that if the gold matrix is accurately made the fit of the porcelain is absolute, and when placed in the cavity the line of division is practically invisible. As soon, however, as the cement is introduced all is changed. I have as yet found no cement which, mixed thin enough to leave the seam inconspicuous, is sufficiently cohesive to retain the filling. Consequently, in labial surfaces of anterior teeth where the cavities have been extensive but shallow, I have had much annoyance from the fillings coming out after two or three months. Such grooving or roughening of the porcelain as has been possible has not been of assistance in these cases. My final success has come in the following manner: The porcelain being ready, with a diamond disk I cut two slots, one on each side, and then set the fillings. At a subsequent filling, the smallest-sized bur is used in these slots, removing the cement and dipping at an angle into the tooth's substance, forming tiny cavities which I fill with gold. The porcelain is thus held in place as a diamond is retained in a ring. Fillings so placed have been in over a year."

The PRESIDENT. It is a great pleasure for me to have this matter brought forward in this way. If I have had any unhappiness in my professional life, it has been that of seeing gold exhibited in the front of the mouth. A system of this kind, that promises so well, seems to me to be of the utmost importance, and I think it is a very good thing that we have had this lecture this evening.

If this material can be made so that it will not discolor, it will be well worth our while to give it a trial.

It seems to me that the objection Dr. Van Woert makes can be overcome. Even if the natural teeth change a good deal, yet what an improvement it is over a gold filling.

I have put in quite a good many of these inlays in the old way; that is, by grinding them in laboriously, and some of them have been in a great many years.

I have sometimes been obliged to take them out and reset them because of the wasting of the cement, and I have in a few instances filled with a little line of gold around the edge of the inlay,—that, of course, to protect the cement underneath; I have quite a number that have been done in that way for a great many years. I can hardly remember when the first were set.

With every one of those that came back to me I have felt I was repaid for the time and trouble spent. Some have not been very satisfactory, as they were not very accurately set; but there was the germ of something that I think has great value in the future.

If this system can be so easily applied I am sure there must be a very great gain, and I feel that we are on the threshold of an era of great importance.

I have seen some of these inlays done by Dr. Jenkins in Dresden for some patients of mine who have been over there. They are far beyond anything that I have been able to do, because the joint has been made better than I have ever been able to make it by grinding. In fact, I have seen some in which you would have to look very sharply indeed to see any line of demarkation, and I have not noticed any change of color, as we had with the glass inlays.

It is a great pleasure to me to see this subject coming up in this way, because one of these days gold fillings in the front of the mouth will be looked upon as the relics of a lost and barbarous art.

Dr. George Evans. I think that my experience with inlays is very much as given by the others present. In glass inlays I thought I had discovered something that was going to be quite useful to me, but my experience also in that has been outlined by others here. It has been such that I have rather retired upon the subject of porcelain inlays, although I recognize the fact that there is still quite a field to be developed. I have listened with great interest to Professor Darby this evening, and I look forward now to development in that line with interest.

Dr. Darby then baked a porcelain inlay, which procedure was watched with great interest by the members of the society.

W. J. Turner, M.D., D.D.S.,
*Editor New York Odontological Society.*

## FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

The First District Dental Society of the State of New York held a regular monthly meeting Tuesday evening, February 8, 1898, at the New York Academy of Medicine, No. 17 West Forty-third street; the president, Dr. Alfred R. Starr, in the chair.

After the transaction of routine business, the president introduced Dr. John T. Usher, of New York, the essayist of the evening, who read a paper entitled,—

### Some Suggestions in Prosthetic Dentistry.

The suggestions embodied in this paper are really a description of some methods introduced and employed in my own practice, and as such they have passed beyond the suggestive stage and assumed the practical.

#### *Vulcanizing on Silver.*

The use of silver as a base-plate material is very limited, especially as a base with rubber attachments. The principal objection to its employment is generally imputed to the fact that it tarnishes in the mouth. But I think we can reasonably infer that, in those cases where rubber attachments are to be made, the real and only objection lies in the difficulty of vulcanizing rubber in contact with silver. There are two ways of accomplishing this in common practice. The first is by tinning the silver base where the rubber is to be attached. This necessitates the sending of the silver to the tinsmith to be tinned. The second method is by introducing tin foil between the silver base and the rubber. The rubber will vulcanize on the tin foil perfectly, but I have never been able to discover either a chemical or a mechanical union between the rubber and the silver, although it is claimed that there is such an union. The explanation of this phenomenon is that silver has an intense affinity for sulfur, and also for all the known vulcanizing agents, such as chlorin, iodin, bromin, etc.; so that instead of the sulfur forming a chemical combination with the rubber it combines with the silver, forming a metallic sulfid. To overcome this we must interpose some non-affinitive substance between the silver and the rubber before we can vulcanize the latter, or if we do interpose an affinitive substance between the rubber and the silver its affinity must be confined to the silver alone. According to the latter theory, it seemed to me that we should not be limited to the employment of tin or tin foil for this purpose, and so I tried gold foil. This proved successful, but there appeared to be no definite union. The next trial was with a silver plate coated with mercury. The rubber vulcanized upon this thoroughly, but on separating it from the silver the amalgamated surface of the silver appeared to be somewhat oxidized, though not to an objectionable extent. The third experiment was on a silver plate coated with mercury and covered with gold foil, to absorb some of the mercury. The results were entirely satisfactory, and the materials are such as are available in every dental office. I think it quite possible that other affinitive agents, such as the metallic chlorids, could be employed for the same purpose, but have not tried them.

### *Another System of Making Gold Crowns.*

In making gold shell crowns for capping the incisor and cuspid teeth, we aim to produce a crown that shall be the exact counterpart of the natural tooth in each particular case. If we possess a set of good dies or forms and facings, such as the Hollingsworth system, we can usually find something that will suit our purpose. But many of us are not provided with the Hollingsworth system or any other system of dies or facings, and so we must resort to other methods of forming our crowns. The method employed by fully seventy-five per cent. of crown- and bridge-workers is the ferrule system; that is, a ferrule is made to fit the neck of the tooth to be crowned a little longer than the finished crown is to be. The face and cutting edge is contoured with pliers, and the lingual portion cut or filed to approximate the shape desired, then placed on a flat piece of gold and soldered. I have seldom seen a good crown made by this method.

The above method not satisfying me, I finally hit upon a system which is highly commended by some of the best crown- and bridge-workers. For cheapness, simplicity, and perfection of contour it can scarcely be equaled, and is not excelled by any other method I know of. An incisor or cuspid crown can be made in from ten to twenty minutes, and the average cost per crown for the gold in the rough is about sixty-five cents for all sizes. The method is as follows: A model is first secured of the tooth to be crowned, and of the adjoining tooth or teeth we wish to match. A plain porcelain tooth, either plate or rubber, is then selected, of the exact width and contour desired, but somewhat longer than the tooth to be crowned. This porcelain tooth is now used as a facing to produce an intaglio die, of zinc, fusible, Babbitt, or type metal in precisely the same manner as with a Hollingsworth facing. But in using the porcelain facing we must proceed as follows: Take a small wooden pill-box about one and one-quarter inches inside diameter, fill it with Chase's or other molding sand, and level it off even with the top of the box. Into this press the porcelain tooth, pins downward, stopping off any unnecessary undercuts with sand. If the die is to be made of fusible metal, such as Melotte's, a rubber ring can be used to form the walls, as in the Hollingsworth system, but if zinc, type, or Babbitt metal is to be used the ring should be of sheet asbestos, fastened with a wire. The porcelain facing should be heated before the hot metal is poured upon it, or bubbles will form on the face of the die. This may be done by heating the head of a flask bolt, holding it in contact with the porcelain facing with one hand while the other holds the ladle in which the metal is being melted. The metal is then poured and a good die obtained. A pattern to cut the gold by is made from a thin paper card, of such shape that when bent around the tooth it will form one continuous piece with a slight margin for bending over the cutting-edge. The gold, gauge 31, is then cut to pattern. The face of the crown is then swaged up in the die, and the wings extending from each side of the face are bent around with pliers on the model to form the lingual surface, cutting away any surplus gold until proper conformity is obtained. The seam is then soldered, the cutting-edge formed and contoured by bending over the surplus at that point upon the lingual surface. The point of the crown is then soldered and stiffened at the same time by putting sufficient solder inside the crown and flowing it in such a manner as to form a solid strip or body across the cutting-edge about one-thirty-second of an inch in thickness. I use porcelain teeth in molding dies as described, not only for the incisor and cuspid teeth, but also for the bicuspids and molars; and it will be readily seen that this system can be applied to every case where the Hollingsworth or any other system can be used, with the advantage in its favor that the facings and forms that can be selected from are almost unlimited. In general practice, however, it will be found that a variety of dies, consisting of about six forms of each of the incisor and cuspid teeth, will enable us to cover the usual requirements in crown-work. I would suggest that some of the dental supply houses make a die plate similar to the Starr die plate, with say six right and six left central incisors and the same number of right and left lateral and cuspid face dies, and place the same on the market. It would then be unnecessary to make our own dies except in special cases.

In soldering gold crowns I use a saturated aqueous solution of borax, made by filling a bottle with water and dropping into it a lump of borax. This is allowed to boil on top of my vulcanizer or elsewhere, and the water will take up a certain amount of the borax, leaving the residue undissolved. An ounce of this solution will last a busy man about a year. In using it the piece to be soldered is simply moistened where the solder is wanted to flow, and the solder will run like a flash, much easier than when the borax powder is used. A very useful help in protecting portions of gold-work from oxidizing while soldering will be found in the use of a solution of yellow ochre of a creamy consistence, painting the parts to be protected. This will be useful also in limiting the area upon which solder is to flow in crown- and bridge-work. An idea prevails among gold-plate and bridge-workers that the approximal surfaces of teeth to be soldered should be somewhat separated. In my own practice I fit these surfaces closely together, and also the backings, using not less than a 28 gauge gold, so that in soldering the shrinkage of the solder is resisted by the backing. I commence with a high-flowing solder, using just sufficient to connect the backings and plate or crowns together, following with an easy-flowing solder of the same carat for flushing or finishing.

### *Discussion.*

Dr. J. BOND LITTIG. I do not know that I can add anything to the subject. There was only one question mentioned to which a little might be added, and that is in regard to the vulcanization upon silver. We all know that any substance that will intervene between the silver and rubber, which has no affinity for sulfur, will enable us to vulcanize on this metal. As the rubber is a hydrocarbon, we know that the hydrogen is taken off by the aid of the sulfur; and if the agent by which it is carried off has a greater affinity for any substance in contact with it, of course vulcanization will not take place.

Dr. JOHN I. HART. I would inquire whether the use of mercury, as an intervening substance, would not materially weaken the plates in practical use, and would suggest Pohlmann's appliance for the plating of the metal with gold, if we use silver as a base for the attachment of rubber teeth, rather than gold foil, which would have no definite attachment, except certain undercuts under rims in the plate.

Dr. USHER. I think this has already been done by plating silver base-plates with some other metal that has a non-affinity for the silver. I do not think that in this case the rubber is dehydrogenized. Dehydrogenation only occurs when the vulcanization is completed, and here the vulcanization has not been effected because the rubber remains just the same; the silver simply extracts the sulfur from it, and the unvulcanized portion does not extend more than possibly one-thirty-second of an inch, the silver having merely absorbed enough of the sulfur (or vulcanizing agent) to satisfy itself. If we take the unvulcanized rubber and dip it in the chlorid of sulfur, it will be vulcanized instantaneously. It will be a vulcanization, but only in the form of a veneering, as the vulcanization will not extend into the center of the rubber.

Dr. DAVID C. BAKER. This process of using a porcelain tooth for making a die is a very ingenious one. It certainly saves the expense of buying the Hollingsworth system, but it seems to me the same thing could be done by making a model with marble-dust and plaster, cutting out the tooth and pressing that into the sand,—first allowing the plaster cast to stand over night,—drying it over a Bunsen burner, and casting the counter-die onto the tooth itself; that is, if there is enough tooth to mold. In cases where I have not tooth enough to mold I fill my tooth up in wax, and contour it as I think it was before it was broken down. In making a die from the plaster tooth you will have to contour with plaster instead of wax.

The essayist spoke of filling these gold fronts in with solder. It seems to me that if the front of the tooth, or the tooth itself, is broken down too low to allow for the solder, it should never have a gold crown. I would say a porcelain crown would be preferable.

In speaking of the thickness of gold used, 31 and 32 gauge was mentioned. In my opinion that is entirely too thin for crowns. When you get your crowns swaged up, polished, and placed in the mouth, I think it would be 34 or 35 gauge. If it should be necessary to remove the crowns, as is often the case when a crown is as thin as that, especially if soldered with a low-grade solder, that is, 18 k. or lower, which some dentists use, when you come to resolder it the crown melts, and you have to make a new one; whereas if you make a crown of 28 or 29 gauge gold it is thick enough to be cut and resoldered. It is a mistake to use thin gold in making crowns.

Dr. S. L. Goldsmith. I wish to indorse what Dr. Baker has said, with this difference: I do not know of a tooth in the front of the mouth that requires a gold crown.

Dr. Usher. As far as the thinning of gold is concerned, you take this gold and place it in your die and take a small stick of any kind, patting it into shape a little. While I am speaking, I may as well suggest that lead is too hard a material to use for this purpose. I use my old air-chamber metal, remelt it, and do not thin the gold any, either in making cusps, bicuspids, or molars. It is not reduced half a gauge, not to speak of a whole gauge, or several gauges, as has been suggested. The air-chamber metal, as we call it, is so much softer than the lead that we get definite results. First we should form our crown as near to the die as we can, by pressure with a stick of some kind. If we lay it flat on the die as it is we shall stretch something, because the gold is held solid on the edges by the metal of the counter-die.

## New Business.

The secretary read a circular which had been prepared, calling attention to the establishing by this society of the "A. L. Northrop, D.D.S., Dental Library Fund" in connection with the library of the Academy of Medicine, the income of the fund only to be applied for dental library purposes.

On motion, the secretary was instructed to send a copy of this circular to all dental publishers, with request to publish the same and to send their monthly journals to be kept on file regularly; also to all dental colleges, asking for their annual announcements.

The secretary read a communication from Mr. John S. Brownne, resident librarian of the New York Academy of Medicine, announcing donations to the dental department of the library as follows: Consolidated Dental Manufacturing Company, fifty numbers of *Items of Interest;* Dr. John H. Meyer, eleven numbers of *Items of Interest;* Dr. A. L. Northrop, two books, six journals, and thirty pamphlets; Dr. S. L. Benson, one hundred and eighteen numbers of journals.

Dr. L. C. LeRoy stated that Dr. J. F. P. Hodson had presented to this society nearly five hundred copies of dental periodicals and state society Transactions, only about one hundred and sixty of which were necessary to complete the files of the dental library. With the consent of Dr. Hodson, he asked the society to relinquish the remainder to the Alumni Association of the New York College of Dentistry, which was, on motion, granted.

On motion of Dr. Baker, the society extended its thanks to the contributors in the communication read by the secretary, the same to appear in the published proceedings.

Adjourned. B. C. Nash, *Secretary.*

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## OHIO STATE DENTAL SOCIETY.

(Concluded from page 303.)

### Second Day—*Afternoon Session* (Continued).

Dr. Grant Molyneaux, Cincinnati, read the following paper:

### A Clinic on a Fusible Alloy.

The increased number and large variety of operations performed in the modern dental office, entailing as they do a considerable amount of mechanism, compel the busy practitioner to seek the most rapid method for the execution of his work. The construction of splints, supports for loose teeth under treatment, regulating and retaining appliances, "bridges," crowns, etc., can only be properly executed under the direct supervision of the attending dentist. If he be a busy man, both time and patience are taxed to the utmost by the cumbersome and clumsy methods generally employed in the execution of the purely mechanical details.

The methods generally employed are to procure an impression either in modelling compound or plaster of Paris, followed by the mixing and pouring of a plaster model, varnishing, waxing, sand molding for die, counter-die, and swaging. This requires two or more visits of the patient when one visit should suffice.

Rapidity in dental operations is always sought, but any method claiming such virtues is generally approached with fear and trembling, especially by our elder brethren. To allay that fear I will state that the subject of this clinic has been known to the dental profession for a quarter of a century, and as possessing many virtues, the greatest of which has been overlooked. In advocating this new (?) rapid method we fully appreciate that old adage, "Make haste slowly," for rapid methods are only valuable when they are accurate and perfectly understood by the operator.

Wood's metal has been used in dentistry for many years, and is known to contain bismuth, cadmium, tin, and lead. The alloy before you contains the same ingredients as Wood's metal, the proportions being changed so as to produce an alloy that may be cast into a modelling compound or wet plaster of Paris impression and give a smooth, accurate model or die in metal.

The advantage of being able to cast metal directly with wet plaster or modelling compound can be appreciated by all practitioners of experience, if the models or die be accurate. We feel safe in saying that a metal composed of five parts of bismuth, three parts of lead, two parts of tin, and two parts of cadmium, properly compounded, will produce when poured into either of the above-named impression materials a more perfect model than can be obtained by the use of plaster. But a model of this metal cannot be used in place of plaster in all cases, as in vulcanite or celluloid work, for the fusing point of the metal is about 130° F. It is especially designed for the making of a perfect die and counter-die with the expenditure of not over five minutes' time, and with the very simplest kind of apparatus. By the use of such an alloy the difficulties of sand molding are overcome and the production of a perfectly adapted plate is the result. To successfully use this, or any low-fusing alloy, several points must be constantly observed:

First. Castings are sharpest and nearest perfect when the metal is poured close to the congealing point.

Second. Overheating causes a loss of time and deterioration of the alloy.

Third. To make a perfect and smooth casting in modelling compound the impression should be first oiled, and then the alloy is cast at a mush-like consistence, when it will fall in a thick, soft mass into the impression, which is quickly jarred on the table, cooled in water, and separated. A little practice will enable the operator to produce a perfect model in every instance.

Fourth. Take a plaster impression directly from the mouth, soak it thoroughly with sperm oil, and pour the alloy at a little higher temperature than for modelling compound and let it stand until cold.

Fifth. In order to obtain a thick base for the model take a thin copper strip about ten or twelve inches long and two inches wide, wrap around the impression, and hold in place by snapping over it a small rubber band. Fill in the spaces between the band and impression with soft putty, which will always be ready for use by being kept under water.

Sixth. To make the counter-die, wrap the copper strip around the base of the die and fill all undercuts and unnecessary parts with the putty, paint over the surface with whiting mixed with water or alcohol, and cast the alloy as cold as possible.

A half-pound screw-top vaseline jar half filled with soft putty and covered with water will keep putty soft for years. In lieu of this take a strip of heavy writing-paper.

Before remelting castings they should be cleaned of all putty or dirt. If, however, the metal becomes contaminated it can be heated until it becomes perfectly fluid, when the impurities may be removed with a piece of blotting-paper. One illustration of the use of this alloy may be suggestive of its many valuable applications.

In adapting a gold or platinum base for full dentures where the recession over the tuberosities and anterior ridge is so great as to make sand molding without a core absolutely impossible, make the model or die of fusible alloy by casting into the impression. For such a case always use plaster, as this can be broken off in such a manner as to be restored and a second die cast. Upon this second the relief or vacuum chamber, made of block tin, can be attached with thick shellac varnish, or the relief can be first trimmed out of the impression. Use the second die for the first stamping of the plate, making the adaptation to the undercut as close as possible with a riveting hammer.

Try the plate in the mouth, and properly trim and wire if necessary. Replace on the used die and wrap the plate and die with one covering of cheese-cloth or thin paper, and place in the Parker shot-swaging device and swage.

The plate cannot now be removed from the die, but by placing it in hot water the metal will run out of the plate, leaving it unchanged in shape. It can now be polished, and after transferring the relief from the old die to the unused one the plate is sprung onto it, and swaging with shot and melting the metal out as before will leave the plate with an adaptation that cannot be procured by any other method.

In taking an impression for metal castings, it should be a little thicker than usual, and any number of dies can be made from the same impression, all of which will be alike.

The compounding of this alloy requires the greatest of care in protecting it from the action of the air during the first melting, and in the manner of adding the metals. As it never again approaches the first heat except by carelessness, the metal will remain permanent in composition and working qualities indefinitely.

The necessary expense of this alloy, which at first may seem unreasonable, will be compensated for in the saving of time in one difficult case. After two years of constant use of this metal I can positively state that it will meet all the claims here made.

Dr. WESTON A. PRICE, Cleveland, read the following paper:

## SOME HARD CASES FOR CATAPHORESIS, WITH SUGGESTIONS.

This paper should be prefaced by a chapter on the general principles underlying and governing the practical application of cataphoresis to the dental organs, which has been omitted. This subject was chosen for two reasons: first to bring out a discussion upon this practical subject, and second to answer some of the many inquiries that have come to me.

In the following, where the expression occurs that the pain limit "is low," we mean that a very weak current produces pain, and when "high" a very strong current will be required before pain is produced.

Suppose a bicuspid, with large buccal cavity, including the loss of the buccal cusp, from a line extending from the sulcus to the gingivæ. The resistance of the tooth high, say 75,000 ohms, and the pain limit very low, say 0.00002 ampere, or one-fiftieth of a milliampere of current, the maximum the tooth will tolerate. In this case the distance to the pulp is short, and relatively the resistance from the surface to the pulp at the point right over it is very much less than at a point from the margin of the dentin; probably not more than one-tenth as great. In this particular case we are to get anchorage grooves for a metallic filling, and of course they must be made near the margins, otherwise the life of the pulp would be endangered. The conditions existing are as follows: An extremely sensitive tooth with a very low pain limit and high resistance, which means that necessarily the process of anesthesia will be slow, and more certainly it would take place most rapidly in the path of least resistance,—viz, directly toward the pulp. This is just the point that cannot be utilized, and the margins where the retaining forms must be obtained are but slightly obtunded. Of course the obtunding of the whole tooth will be secured with the anesthesia of the pulp, but that in this case of so low a pain limit would be a very long operation, probably not less than thirty or forty minutes. Besides, it is going away around to produce what we want,—viz, the obtunding of the dentin at its margins. We will suppose the decay to be removed by a short treatment in the ordinary way. Now cover all the dentin with oxyphosphate cement or chloro-percha, except where the retaining grooves are to be made, and apply as usual, and it will be found that in very much less time they can be cut painlessly. This simply concentrates the energy to the part we wish to anesthetize.

One of the most difficult conditions to combat is that of a secondary deposit of dentin, either in the pulp-chamber or the tubuli. In these cases, and especially the latter, the sensitiveness is sometimes very acute, even extreme, notwithstanding the fact that the dentinal fibers have been reduced in size to a very great extent. In typical cases of this condition the resistance through the tooth to the pulp runs up to hundreds of thousands of ohms.

A typical case was as follows (see record book No. 1, page 4): An upper left cuspid in which both mechanical and chemical abrasion had denuded the entire occlusal surface almost to the pulp line. The dentin exhibited a surface almost as hard and smooth as glass, and extremely sensitive. The bite was such that no protection could be put over the nearly exposed pulp, which was the source of extreme discomfort and inconvenience to the patient, who was about fifty years of age. Two things were indicated, the protection of the tooth by a gold filling and the previous destruction of the pulp. Everything was adjusted as usual and the current allowed to run while inserting a large gold filling in another tooth. The current was increased to forty-two volts, from dry cells, and the patient felt no sensation. A milliamperemeter, reading in fifths, showed no accurate reading, but the Rowland d'Arsonval galvanometer, which is adjusted to read in decimals of amperes, registered 0.000093, making the resistance of the tooth approximately 450,000 ohms. The current was allowed to run for an hour while completing the other operation, when to my great surprise only the surface and to a very slight depth was anesthetized, and below that it was positively unbearable. Of course I was chagrined and disappointed, and especially so that it had happened with this particular patient. A new appointment was made to give me an opportunity to study the case. The next application was made as follows: The entire surface was covered with cement, quite thick, and a small bur, about No. 5, used to drill a hole through it, directly over the pulp. We were forcibly reassured of the extreme sensitiveness of the dentin when the bur reached it. The anode was placed in this small hole, which was a very small platinum wire twisted with some fibers of cotton, and was kept moist with an aqueous solution of cocain nearly saturated. The voltage was increased to seventy-two from dry cells, without pain. The amperage was 0.00013, showing the resistance to be about 550,000 ohms; the increase of resistance over the first application is of course explained by the diminished cross-sectional area of the path through the dentin. In ten minutes I drilled almost to the pulp without sensation, and reduced the resistance just half,—viz, to 275,000 ohms. Another application was made of 0.00026 ampere at seventy-two volts, for fifteen minutes, when the entire pulp was removed with the drill and a broach, without a particle of sensation, and the operation completed at once. This method comes into service very often, as for example the rapid anesthesia of a pulp in any denuded and broken-down tooth requiring to be crowned, or where a great deal of sensitive surface must be operated upon, as in chemical abrasion of a molar. In this latter case the pulp may be anesthetized for a time, and not injured nor approached, thereby allowing the tooth to be worked upon at will for the time. A beautiful case of treatment by this method will be found in book 2, page 56.

The other form of secondary deposit—viz, within the pulp-chamber, thereby forming a dense protection—is occasionally the source of much hindrance to cataphoresis. As these are best demonstrated by actual experience, the following is a typical case: A right upper lateral which had been the source of constant neuralgia for months, and extremely sensitive to thermal changes applied to the tooth, at any point. Caries was so extensive that anchorage could not be had for a gold filling without using the pulp-chamber, which with the above abnormal conditions indicated the destruction of the pulp. Application was made while inserting another gold filling. The pain limit was found at 0.00002 ampere, or one-fiftieth of a milliampere and twenty-six volts, making the resistance 130,000 ohms. This was surprisingly high. When I undertook to drill into the pulp-chamber I found it receded, and although the current had been running long enough to anesthetize perfectly I found that directly toward the pulp it was still sensitive, though in some directions around this point there seemed to be a perfect anesthesia. From the figures and the conditions I decided after studying the case that the resistance to the pulp was greater than the resistance from margins around the tooth, and the current was probably mostly going in that direction instead of toward the pulp. Accordingly the rubber cloth was forced up under the gum, and a piece of gutta-percha placed between the gum and the tooth, where the shortest circuit seemed probable, and another application was made with good success in a few minutes.

It occasionally happens that we want to remove the pulp for immediate filling in a bicuspid or sometimes a molar. Probably the patient has come some distance, and it will be a great convenience to complete the operation at the same sitting. It frequently happens that after using cataphoresis for some time, which we think should be long enough, we try to drill out the pulp and find suddenly at some point there is very definite sensation. Perhaps we make another long application, and this point is but slightly improved. This is certainly discouraging, and I confess I have been quite inconvenienced by it. What is the explanation of it? Perhaps it is an occlusal cavity, where we are sure our insulation is perfect. I have never found just this condition in a single-rooted tooth. Time will not permit us to discuss in this paper the conditions which determine the pain limit. It is a fact, however, that nearly every root of a two- or three-rooted tooth has a distinct and different pain limit from the others. It will not follow that the one with the lowest pain limit, or the most sensitive to the current, is getting the most current; indeed, it may be quite the reverse, as is easily demonstrated. In the case we will suppose, which is like many I have detailed, record of the resistance in the most sensitive root is probably several times that in the other root, say it is ten times as great.

Of course, then, ten times as much current is passing through the other root, and on account of the great density of current that root of least resistance is anesthetized much more rapidly. All the time the total amount of current used is determined by the pain limit of the tooth, which simply means by the pain limit of the most sensitive root, which in this case is the one getting the least current. As the process of anesthesia advances it is not proportional in the different roots, consequently the rise of pain limit is not proportional. Probably in one root it has advanced from one-tenth milliampere to one-half in twelve minutes, while in another root from one-fiftieth to one-forty-fifth of a milliampere.

Here, clearly, the root of low pain limit or greater sensitiveness is determining the rate of increase for the whole tooth, and long before the root is perfectly anesthetized the other is so completely that we have been losing great quantities of energy to no avail, or possibly to a deleterious effect at the apex of one of the other roots. I have almost always found in these cases that after twelve or fifteen minutes I could remove the pulp without sensation, from one root of a two-rooted tooth, or probably two from a three-rooted tooth. Now, just here lies our opportunity to save time. Plug these roots up with some cotton and sandarac or gutta-percha, and concentrate the energy upon the remaining root, and the ultimate result will be very gratifying.

One of this class was as follows (see record book No. 1, page 74): Tooth No. 19, lower left first permanent molar, patient about twenty-five. Suppurating exposure had been giving trouble. Operation had to be completed at the same sitting. On applying cataphoresis, the pain limit was reached at 0.12 milliampere, or twelve-one-hundred-thousandths of an ampere. The voltage was four, and the resistance 33,330 ohms. The medicament used was a saturated solution of cocain in guaiacol. On using for ten minutes the pain limit was raised to 0.25 milliampere and the voltage to eight, making the resistance in the circuit 32,000 ohms. The contents of the pulp-chamber were removed with a drill without sensation, except over the anterior root. A second application was made when the pain limit was reached at 0.25 milliampere, with a voltage of 5.3, making the resistance of the circuit 26,840 ohms.

On examination I found the anterior root still sensitive, and no sensation in the posterior root, even beyond the apex, which had a large foramen. The tissue was entirely removed from this, and the root filled with gutta-percha plug, and a new application made, when the pain limit was found at 0.15 milliampere with 9.3 volts, making the resistance of this root 62,000 ohms. In eight minutes the pain limit had raised so that the current was increased to 0.7 milliampere, and the tissue of this root entirely removed without sensation, and both filled at once. I have had this condition duplicated several times in two-rooted bicuspids, and have used this treatment to good advantage.

Probably one of the most common difficult cases is found where there is confined suppurative inflammation in the pulp, and in which the current produces pain apparently by the pressure of the gas developed. These cases are very easily recognized with the milliamperemeter, for instead of the pain limit getting high, it recedes. If it is not pronounced it will probably turn in a few minutes, and proceed normally; but if very marked lowering of the pain limit is present, it has been almost always the case in my experience that on removing the anode, and carefully raising the residual decay over the nearest point to the pulp, pus will escape. This is a very strong indication of this condition. And with a very sharp excavator the decay is easily raised without pain. After the escape of the pressure the cataphoric application will be usually normal.

Some considerable study has been made to see if the organic acids of the pus did not disorganize the alkaloïd cocain, thereby destroying its therapeutic action. In passing 0.00025 ampere through a layer of ten per cent. cocain hydrochlorid, then a layer of pus and a layer of surface water separated by porous partitions in a glass tube, as also at the same time a series with blood, and one with water instead of pus, for twenty-five minutes, we found no great difference in the amount of cocain present in each, though apparently some less in the pus. Not a satisfactory test for final conclusions.

Sometimes we get cases where it is practically impossible to retain the anode; for example, a broken-down lower molar or bicuspid with large, sensitive exposure. The patient could not endure to have an electrode held on the exposed pulp. A convenient method of retaining it is, after drying, lay a piece of dry cotton over the point of exposure and flow cement over it. As soon as it stiffens, puncture a hole through the cement to the dry cotton. Saturate it through the hole, and wedge with cotton the small soft wire anode in the hole. This perfectly insulates the tooth from the surrounding gum and clamp, and holds the anode perfectly.

I think it is seldom advisable to try to do two cavities at once; have a double apparatus and do them separately; it saves lots of time. The cases I have cited are quite exceptional, and are only a very few of the exceptional cases; however, in my judgment by far the great majority of failures come from the simple, easy cases, through nothing more or less than imperfect insulation. I do not believe there are a dozen operators in the state who actually in a score of cases get fifty per cent. of the current they use through the tooth they are obtunding. I very often find ten times as much current leaking as is going through the tooth. The fact is that putting a rubber over a wet tooth and fastening it with a clamp, and perhaps a single or double waxed ligature to assist in holding the rubber, is not, except in the rarest cases, an insulation to the current. The ligature soon gets wet, the clamp touches the wet tooth and gum, and if you will test one hundred of the cases adjusted in this way I am sure you will find fully ninety-five that will have much less resistance than the average tooth. It is an easy matter to test them; of course a milliamperemeter is essential; and, by the way, I believe the time is not far distant, and should be here now, when it will be considered positively malpractice for a dentist to use cataphoresis without a milliamperemeter. It would be just as reasonable to send a locomotive engineer out with his load of human freight without a steam gauge or safety valve. But, some one says, the pain limit is the safety valve. Oh, no, it isn't. Suppose a nerve is saturated with cocain, what power has it of crying out when a destructive amount of current is passing through it?

Cataphoresis in the hands of the lazy, reckless, unskilled dentist will be a positive curse to humanity, while in the hands of the earnest, thoughtful, skillful dentist it is one of the greatest blessings that has ever come to us.

Success with cataphoresis is synonymous with competency, and this will always be the case. You show me in the coming decades a man who is practicing dentistry simply for what he can get out of it, while putting just as little as he can into it, and I will show you a man who isn't having success with cataphoresis. Time will develop two things,—viz, a clear conception of all the phenomena of cataphoresis, and the most consistent practical application of the process of cataphoresis. If any critic is unsuccessful, the reflection will not be upon cataphoresis, but entirely upon himself.

Is it not truly wonderful that a subject that has taken months and months of careful investigation on the part of some earnest investigators, to secure a few fundamental principles, with very accurate and delicate apparatus, could be weighed and appreciated and its future prescribed by some others in a few weeks, with very inferior apparatus? I mention this because I have taken the trouble to investigate, to find with what authority some critics have spoken, and have found that scarcely any had milliamperemeters; and most had such crude apparatus as the present stage of advancement would deem a guarantee of failure, owing to their deficiency. We know that many teeth have so delicate a sense of pain to variations of current that they will respond with severe pain to the variation of the two-hundred-thousandth of an ampere, and some to much less. Now, suppose we try to use some of the early instruments on this case. For example, a short column of surface water, say five inches. This would have a total variation of about five thousand ohms. Now, to give a variation of current less than the above, at say ten volts, the plunge would have to drop less than the one-hundredth of an inch, through the first inch, which was a mechanical impossibility as they were adjusted. If it dropped one-tenth of an inch the current would rise away beyond the pain limit and produce intense pain. They could not give success in such cases, nor could scarcely any, if any, of the early instruments; and I have not seen a modern type that has as fine adjustment as many teeth demand. The future must furnish these two things: instruments of a greater total and more gradual variation, and much more knowledge, for as yet we scarcely know the alphabet of the subject.

It was my purpose to publish a quantity of data showing the extent of time and the amount of current required at the beginning and ending of each operation, and size of cavity and medicine used, for a great variety of cases, but the length of this paper will not permit.

There was no discussion of the above paper, owing to lack of time, and the society adjourned to meet at 8 P.M.

### *Evening Session.*

Dr. G. W. WELD, New York, read a paper entitled "Filling Root-Canals by the Aid of Diagrams and Chemicals." This paper was practically the same as the paper read before the New York Odontological Society, and published in the DENTAL COSMOS for January, 1897, page 20. To show that the acid used in connection with the metal point would not act destructively upon the tooth, Dr. Weld placed some of it in a saucer and some sulfuric acid in another saucer, and immersed a napkin in each. After the paper was read the napkin in the sulfuric acid was shown to have been destroyed, while that in the acid he uses was not injured in texture.

His paper was illustrated by means of a lantern, and after the paper was read Professor Stone, of the Ohio University, who had charge of the lantern, showed a number of very beautiful views of scenery in the West; also astronomical views which were highly appreciated.

## *Discussion.*

Dr. J. S. Cassidy, Covington, Ky. I feel greatly honored in having been invited by this society to discuss the excellent paper just read to us by Dr. Weld. It materializes some of the dreams we all have had, more or less, as to easier methods of dealing with root-canals than have been obtained heretofore. The diagrams may or may not be of use to the older practitioners, but to the younger members of the profession the suggestion of definite mathematical precision will be of great value as an aid in our search for these invisible openings.

Dr. Weld had some reason, I suppose, for showing us these experiments with sulfuric acid, although it is not a constituent of his preparation. Sulfuric acid drinks up a dry napkin so readily simply because it loves water, and, finding the elements H and O, which (with C) constitute principally the substance of the linen or cotton, it compels them to unite to form water ($H_2O$) that its thirst may be satisfied. This is the characteristic action of sulfuric acid on organized substances; but with dry enamel, which, unlike the dry napkin, is almost devoid constitutionally of H and O, the acid cannot manufacture water, and therefore its effect on dry enamel appears to be nil. With dentin, however, the case would be different, for this substance is made up of a relatively large amount of what is erroneously called "animal" matter, which constitutionally contains, like the napkin, H and O, and would react on the acid in the same way with the additional formation of $CaSO_4$. The latter compound, being insoluble, would be incorporated with the free C, thus rendering the action of sulfuric acid on dentin self-limiting.

Inasmuch as I have had no clinical experience with Dr. Weld's process, I can discuss it only in a general way. We know something of the chemicals he uses, and therefore the statement that they will react in a certain manner, under given conditions, is no more theoretical than are the results of any well-attested chemical experiment. His fluid preparation, he says, is composed of nitric and hydrochloric acids, and his metallic pin of zinc mainly, and silver and tin.

Permit me to say right here that I think the doctor has been fortunate in his selection of materials, that probably he has builded better than he knew. Nitro-hydrochloric acid in the presence of a disturbing cause, platinum for instance, will react as follows: $2HNO_3 + 6HCl + Pt = 4H_2O + 2NOCl + PtCl_4$. When, however, an alloy of several metals is attacked, although the same general interaction occurs between the H and O and the setting free of the gas nitrosyl (NO Cl), there would be special compounds of each metal produced, just the same as if they were individually free, the attack being somewhat retarded by the polarizing influence due to the intimate relations of the metals within the alloy. With the zinc, soluble nitrate and chlorid would be formed. The nitrate changing to an oxid, this latter would unite with the chlorid, and we would have resulting insoluble zinc oxychlorid ($Zn_2OCl_2$). The silver in the alloy prefers the nitric acid portion of the liquid, but the soluble silver nitrate formed will develop, if there be albuminous matter present, into insoluble silver oxid and acid albumen, and any residue of the salt will be changed by the free Cl or soluble chlorids present into insoluble silver chlorid (AgCl). The tin of the alloy will take up with the nascent Cl, resulting in the practically insoluble stannic chlorid ($SnCl_4$).

Thus we see that the ultimate products of the reaction between nitro-hydrochloric acid and an alloy of zinc, silver, and tin are disinfecting and insoluble, and therefore ideal in their intrinsic properties for permanent aseptic fillings in root-canals.

Dr. Weld says his dental acid does not attack tooth-substance; if such be the fact, it must be owing to the resinous hydrocarbon incorporated with it, which seems to me to be a mistaken virtue; less of this retarding substance might be indicated if we expect the acid to assist in obtaining entrance to the root-canals by dissolving a part of the osseous matter involved. In case of such solution the resulting compound of calcium would itself be desirable,—namely, calcium-oxychlorid (CaO, CaCl), the bleaching powder of commerce, which from time immemorial has been a favorite chemical with dentists, as can be attested by Dr. Frank Hunter, of Cincinnati, who claims to have used it in his practice as many as fifty years ago as a dressing in root-canals.

This suggests the denial that Schreier, of Vienna, with his KNa, was the first to introduce chemicals for disinfecting these parts; calcium oxychlorid, potassium permanganate, and hydrogen peroxid are purely chemical disinfectants, and were used for the purpose long before Dr. Schreier's very creditable method was introduced.

## CLINICS.

1. Microscopic exhibit, showing silver nitrate in root-canal treatment, Dr. L. P. Bethel, Kent.
2. Richmond crown, Dr. John F. Stephan, Cleveland.
3. Hollingsworth crown, Dr. W. A. Siddall, Cleveland.
4. Davis crown, Dr. J. R. Owens, Cleveland.
5. Knapp crown, Dr. C. G. Myers, Cleveland.
6. Amalgam crown, Dr. Henry Barnes, Cleveland.
7. Dow portable electric assistant, Dr. W. H. Todd, Columbus.
8. Fusible alloy, Dr. Grant Molyneaux, Cincinnati.
9. Apical amputation of the root. Dr. E. Ballard Lodge, Cleveland.
10. Demonstration of the construction of milliamperemeter, Dr. W. H. Hersh, Piqua.
11. Porcelain staining, Dr. Geo. H. Wilson, Cleveland.
12. Regulating appliances, Dr. W. S. Locke, Cincinnati.
13. Cleft palate, Dr. W. T. Jones, Nelsonville.
14. Tin foil and tin and gold fillings made with steel pluggers, the same fillings made with ivory pluggers, using both mallet and hand-pressure, Dr. H. L. Ambler, Cleveland.
15. Preparation and filling of compound cavities in anterior teeth, Dr. S. D. Ruggles, Portsmouth.

The society then adjourned.

# ANNUAL CONVENTION OF THE SIXTH, SEVENTH, AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

(Concluded from page 309.)

## SECOND DAY—*Afternoon Session.*

THE convention was called to order at three o'clock, and Dr. C. S. BECK, of Wilkes-Barre, Pa., read a paper entitled, "Is Dental Caries accompanied by Inflammatory Action?"*

### *Discussion.*

Dr. C. S. BUTLER said that the question stated in the title of the paper had been the subject of contention among the dental profession for many years, and it could not be proven so absolutely that either the affirmative or negative answer would be generally accepted. His views inclined him to an affirmative answer. Decay is a pathological condition, and must be accompanied by inflammation. The old formula for inflammation, heat, redness, and swelling, has been shown to be erroneous. Inflammation can occur without the vascular system, and in the lower forms of animal life does so occur. In caries of the teeth inflammation is shown by the action of the pulp in throwing out a barrier against the progress of the disease and in the pulp withdrawing itself from the approaching disease. These two processes are purely the result of inflammation, or appear to be.

He was much pleased with Dr. Beck's paper, and as a contribution to the same subject he called the attention of the convention to the paper read by Dr. J. Leon Williams before the New York Odontological Society and published in the report of that society in the DENTAL COSMOS. He considered this paper the most valuable contribution to the study of dental pathology since Dr. Miller demonstrated the cause of dental caries.

Dr. Beck likened inflammatory action to an army of defense. He said that almost any cause may produce the inflammation; for instance, a mosquito with his bite injects a poisonous substance which attacks the red corpuscles of the blood, but the white corpuscles come to the rescue and overcome the poison. So when a spot of decay begins to attack a tooth the pulp will throw out a breastwork of defense, a deposit of calcium salts between itself and the decay. How does that deposit get there? We cannot account for it in any other way than by action similar to that of inflammation.

Dr. W. W. BELCHER, of Rochester, said if a new healthy pulp from a tooth is ground between two pieces of glass, gritty particles will be found; these particles must be calcic deposits. This would indicate that a deposit of calcium salts from the pulp was possible.

The discussion closed, and Dr. S. ESCHELMAN read a paper on "Formalin."†

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*Printed in full at page 351 of the current number.

†Printed in full at page 344 of the current number.

### *Discussion.*

Dr. W. A. BARROWS, Buffalo, said formaldehyd, one of the new germicides, has various uses. It is produced by passing methyl alcohol over a special lamp in connection with heated platinum asbestos. When taken internally in very small doses it will increase blood-pressure and raise the temperature. It can be used to harden microscopical preparations. As a disinfectant it is very powerful, and will not affect colors of paper or fabrics. As it becomes better known it will probably come into more general use. It is the basis of Wampole's disinfectant. He had used it to some extent, and Dr. Jack, of Philadelphia, uses it for devitalizing teeth.

Dr. F. W. LOW had been using formalin for a short time, and was well pleased with the results. It would be well to discuss the whole field of antiseptics; there are so many in use by the profession, and we are still reaching out for new ones, which proves that none are entirely satisfactory. He thought that formalin promised to be nearer the ideal than any of its predecessors.

Dr. D. H. WAUGH, Rochester, asked Dr. Eschelman what per cent. of formalin he used to disinfect instruments, and what per cent. to disinfect tooth-canals.

Dr. ESCHELMAN said from two to five per cent. for instruments; he had not used it to disinfect root-canals, but Dr. Low said that he had used it in forty per cent. solution.

The subject was passed, and Dr. F. W. LOW read the following paper:

### BLEACHING WITH CATAPHORESIS.

Many of you are aware that I have been contending that in the matter of bleaching with cataphoresis we have all been working thus far with the cart before the horse. Experimentally I have tried almost everything that is bleachable, and almost everything that will bleach, from pure water to pyrozone, and I have tried them all backward and forward. Night before last I sat up till ten o'clock to help bleach a human tooth. The clinical history runs something as follows:

The first visit of the patient to any dentist was nearly three years ago, being then driven to it by a regular concert of toothaches. The dentist applied arsenic to, I think, three pulps, and, having subsequently extirpated, he filled the crown cavities in all these teeth without having first made a root-filling in any. The consequence of each of these empty houses was a fistula at the apex of every root.

When the patient reappeared for further relief she was assured that this condition almost always followed, and that it was one to do no harm. In the mean time all three of the teeth began rapidly to darken. Two were bicuspids and did not show much, and as yet have not been disturbed. The third, a central incisor, was looking so badly it could no longer be endured; besides, it was growing quite tender, and the fistula was discharging considerably. After opening it up it took several treatments to close the fistula and stop the weeping of serum or pus from the apical space into pulp-chamber. Night before last, however, it was deemed safe to close the apex with a gutta-percha cone varnished in chloro-percha, and so the bleaching was attempted.

Dr. Haynes (whose patient is this interesting subject) and I bleached by relays for an hour and a half. The pyrozone, a twenty-five per cent. ethereal solution, converted to an aqueous by substitution and evaporation, was introduced into the pulp-chamber through a mesial opening. At first a mighty commotion was occasioned, although the patient could not bear a current to exceed a tenth of a milliampere. The tooth was somewhat whitened almost immediately, and then our progress was at a standstill. We each sat alternately on our operating stool coaxing a forlorn hope. At last we had an inspiration. A large approximal gold filling was removed. Not only the dentin lining the cavity wall, but the surface of the entire pulp-cavity as well, even the remote coronal extremities, had that peculiar glazed and darkened look that tooth-structure has when stained with silver nitrate solution. A sharp bud-shaped bur (small size), revolving rapidly, was placed over these entire glazed surfaces, but at no place was the dentin deeply cut.

Cataphoresis and pyrozone were again brought into requisition when these dammed up orifices to the dentinal tubuli were opened, and it walked right into them like magic, and in fifteen minutes we had accomplished more than we had previously done in the hour and a half.

At this juncture the open ends of the dentinal tubuli, both in the root and crown, were carefully sealed with the whitest obtainable thinly mixed oxychlorid filling, and a temporary gutta-percha stopping filled up the cavity. Gold will be substituted for the gutta-percha later. When the rubber-dam was finally removed the only adverse criticism that could be made was that, if anything, the tooth was something over-bleached, and this error it is confidently anticipated time will shortly overcome.

### *Discussion.*

Dr. F. B. Darby, Elmira, asked Dr. Low why he wanted an aqueous solution of the pyrozone.

Dr. Low said because the aqueous solution was acted upon better by the current. In applying cataphoresis with pyrozone he placed the negative pole in the tooth; when cocain hydrochlorid is used with cataphoresis the positive pole is placed in the tooth. In pyrozone the effect of the current is to make the oxygen seek the positive pole, and if the positive pole was in the tooth and the negative pole in the hand the effect would be nothing, but when the poles are reversed the current carries the solution into the tissues.

Dr. Beck asked if Dr. Low removed all discolored dentin when he burred the surface off.

Dr. Low said only the glazed portion.

Dr. R. G. Payne, Buffalo, uses twenty-five per cent. ethereal solution of pyrozone to whiten the exterior of the teeth. He puts rubber-dam on and then applies the pyrozone, and it restores the natural color. He uses it on the anterior teeth only.

Dr. L. S. GOBLE thought it would be well to paint the gums with albolene oil to protect them from the escharotic action of the pyrozone.

Dr. LOW said there are two classes of people with whom it is useless to try cataphoresis for obtunding sensitive teeth; one class seems to be immune to cocain, the other one so sensitive to electricity that the remedy is worse than the sensitive tooth. In either of these classes he puts away his cataphoric apparatus and goes on with the necessary excavating, using hot air to lessen the suffering. His experience with cataphoresis had in the main been very satisfactory. He had taken out pulps without the least particle of pain. When excavating sensitive dentin he did not use cataphoresis for more than eight minutes, as he did not want complete anesthesia, as he would be liable to excavate too far.

Dr. BECK asked Dr. Low if he thought it was possible for cement placed in a tooth to enter the tubuli of the dentin.

Dr. LOW said no, but some of the free acid in the cement might, and thus shut the tubuli against the entrance of the cocain. He thought that teeth that had been filled with cements were not subject to cataphoric treatment.

Dr. C. S. BUTLER, Buffalo, thought Dr. Low was wrong in the supposition that coagulum in the tubuli would prevent the passage of cocain. He thought he was wrong, because the dentin under a cement filling, after it was removed, is usually found to be hypersensitive.

Dr. C. W. STAINTON said that the reason Dr. Butler found dentin under cement fillings to be hypersensitive was because he took out fillings that had been inserted by other dentists, and which had remained so long that decay had begun beneath them. He had heard Dr. Butler reiterate this assertion so often that he wanted to say he often put cement fillings in teeth to obtund sensitive dentin. He asked all present who believed that cement fillings would obtund sensitive dentin to hold up their hands. All held up hands except Dr. Butler.

Dr. BUTLER said that when he said that dentin was hypersensitive under cement fillings, he meant those which had been in for some time.

Dr. LOW thought that the use of sharp burs and rapid work would lessen the sensitiveness.

The convention then on motion adjourned, to meet next year with the Sixth District Society.

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## LOUISIANA STATE DENTAL SOCIETY.

THE annual meeting of the Louisiana State Dental Society was held at New Orleans on February 23 and 24, 1898. Many interesting papers were read and a number of good clinics presented by prominent members of the profession. Committees were appointed to formulate plans for proper legislation, and delegates were appointed to the Omaha Convention. Apropos to the regular routine work of the society, arrangements were made for the Southern Dental Association to hold a joint meeting with the Louisiana State Dental Society, to be held in New Orleans next February, and judging from the present outlook the greatest and most successful meeting of dentists in the South is fully expected.

The following officers were elected to serve for the coming term: Drs. J. J. Sarrazin, president; J. F. Johnston, first vice-president; L. D. Archinard, second vice-president; Wallace Wood, Jr., secretary, and C. V. Vignes, treasurer. Executive Committee, Jos. Bauer, D.D.S., P. J. Fredricks, D.D.S., Chas. Mermilliod, Jr., D.D.S., M. R. Fisher, D.D.S., C. Ratsburg, D.D.S., Wallace Wood, Jr., D.D.S., secretary. Board of Dental Examiners, Andrew G. Friedrichs, D.D.S., president; C. V. Vignes, secretary; M. K. Fisher, D.D.S., F. M. Comegys, D.D.S., C. B. Johnston, D.D.S.

## VERMONT STATE DENTAL SOCIETY.

At the twenty-second annual meeting of the Vermont State Dental Society, held at Rutland, Vt., March 16-18, 1898, the following officers were elected for the ensuing year: Dr. J. A. Robinson, Morrisville, president; Dr. K. L. Cleaves, Montpelier, first vice-president; Dr. H. Turrill, Rutland, second vice-president; Dr. T. Mound, Rutland, recording secretary; Dr. Grace L. Bosworth, Rutland, corresponding secretary; Dr. W. H. Munsell, Wells River, treasurer; Dr. G. W. Hoffman, White River Junction, state prosecutor; Drs. C. W. Steele, Barre; J. E. Taggart, Burlington; J. A. Pearsons, Barton, executive committee.

The next meeting will be held at Burlington, on the third Wednesday in March, 1899.

Thomas Mound, *Rec. Sec'y.*

## EASTERN ILLINOIS DENTAL SOCIETY.

The Eastern Illinois Dental Society held its twelfth annual meeting at Kankakee, March 15 and 16, 1898. There was a very interesting session, and the following officers were elected: I. B. Johnson, president, Onarga; J. R. Rayburn, vice-president, Fairbury; Wm. M. Griffith, secretary, Kankakee; S. A. Campbell, treasurer, Mattoon; James Watson, librarian, Chebause; A. M. Hudson, superintendent of clinics, Kankakee. Executive Committee, W. A. Hoover, F. M. Conkey, A. S. Wattey.

The next meeting will be held at Joliet, Ill., the third Tuesday and Wednesday in March, 1899.

Wm. M. Griffith, *Sec'y.*

## CENTRAL DENTAL ASSOCIATION OF NORTHERN NEW JERSEY.

At the annual meeting of the Central Dental Association of Northern New Jersey, held on February 21, 1898, the following officers were elected for the ensuing year: F. Edsall Riley, D.D.S., Newark, president; C. S. Hardy, D.D.S., Summit, vice-president; H. S. Sutphen, D.D.S., 24 East Kinney street, Newark, secretary; Chas. A. Meeker, D.D.S., Newark, treasurer. Executive Committee, F. G. Gregory, D.D.S., chairman, Newark; Fred. C. Barlow, D.D.S., Jersey City; C. W. Hoblitzell, D.D.S., Jersey City; Wm. H. Pruden, D.D.S., Paterson; Wm. E. Truex, D.D.S., Freehold.

H. S. Sutphen, D.D.S., *Secretary.*

## NATIONAL DENTAL ASSOCIATION—SOUTHERN BRANCH.

At the first annual meeting of the Southern Branch of the National Dental Association, held at St. Augustine, Fla., February 22-25, 1898, the following officers were elected: W. E. Walker, Pass Christian, Miss., president; T. P. Hinman, Atlanta, Ga., first vice-president; H. H. Johnson, Macon, Ga., second vice-president; E. F. Adair, Harmony Grove, Ga., third vice-president; C. L. Alexander, Charlotte, N. C., corresponding secretary; S. W. Foster, Atlanta, Ga., recording secretary; B. D. Brabson, Knoxville, Tenn., treasurer.

# DENTAL COLLEGE COMMENCEMENTS.

## PITTSBURG DENTAL COLLEGE.

The second annual commencement exercises of the Pittsburg Dental College (department of Western University of Pennsylvania) were held in the Duquesne Theater, Pittsburg, Pa., on Friday afternoon, April 1, 1898.

The faculty address was delivered by Dr. J. G. Templeton, dean of the dental department.

The number of matriculates for the session was one hundred and fifty-nine.

The degree of D.D.S. was conferred on the following graduates by Chancellor Holland:

| NAME. | STATE. | NAME. | STATE. |
|---|---|---|---|
| F. H. Bassett | West Virginia. | F. C. Hum | Pennsylvania. |
| N. J. Baxter | Pennsylvania. | R. S. King | Pennsylvania. |
| H. J. Brown | Pennsylvania. | H. T. McCune | Pennsylvania. |
| W. F. Erbey | Pennsylvania. | R. J. Old | Pennsylvania. |
| S. P. Earnest, M.D. | Pennsylvania. | G. W. Otto | West Virginia. |
| D. W. Flint | Pennsylvania. | H. B. Reamer | Pennsylvania. |
| F. C. Friesell | Pennsylvania. | O. M. Sorber | Pennsylvania. |
| A. L. Foote | Ohio. | W. R. Watterson | Pennsylvania. |
| C. W. Hunt | Pennsylvania. | H. W. Wick | Pennsylvania. |

## PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

THE forty-second annual commencement exercises of the Pennsylvania College of Dental Surgery were held in the Academy of Music, Philadelphia, on Tuesday evening, April 5, 1898.

The address to the graduates was delivered by Professor Henry Leffmann, M.D., D.D.S.

The number of matriculates for the session was three hundred and seventy-six.

The degree of D.D.S. was conferred on the following graduates by I. Minis Hays, M.D., president of the college:

| NAME. | STATE OR COUNTRY. |
|---|---|
| R. G. Ackley | Canada. |
| J. W. Adams | Illinois. |
| H. A. Anderson | Bahama Islands. |
| Janett W. Angle | New York. |
| G. B. Aumack | New Jersey. |
| Clifford D. Beale | Pennsylvania. |
| H. W. Black | Nova Scotia. |
| C. B. Blackman | Connecticut. |
| Anna Block | Russia. |
| C. Carayannapulo | Roumania. |
| W. L. Carhart | New Jersey. |
| Chas. E. Chase | Pennsylvania. |
| F. D. Clark | Connecticut. |
| La Mancha Clark | New York. |
| V. L. Clark | Canada. |
| G. W. Coder | Pennsylvania. |
| S. Collins | New York. |
| S. D. Cornish | Pennsylvania. |
| Anna G. Crothers | Maryland. |
| A. Van E. Davis | Pennsylvania. |
| S. A. de Waltoff | Pennsylvania. |
| J. H. Drummond | Canada. |
| J. Y. Duncan | Canada. |
| Chas. W. Dunlevy | Georgia. |
| J. G. Edwards | France. |
| C. E. Eilenberger | Pennsylvania. |
| H. L. Erb | Pennsylvania. |
| J. W. Freyling | Pennsylvania. |
| R. E. Gallagher | Pennsylvania. |
| F. P. Gleeson | Rhode Island. |
| H. N. Gorham | Canada. |
| Florence S. Green | Colorado. |
| C. Grenache | Massachusetts. |
| Louise B. Grover | Pennsylvania. |
| J. S. Hall | New York. |
| W. L. Harpel | Pennsylvania. |
| E. R. Hart | Canada. |
| Wm. F. Hayes | New Jersey. |
| W. J. Henchey | New York. |
| A. F. Henson | Pennsylvania. |
| E. S. Hipple | Pennsylvania. |
| Henry Hoppman | Pennsylvania. |
| John Hutchison | Pennsylvania. |
| Claude W. Johnson | Pennsylvania. |
| John E. Johnson | Pennsylvania. |
| Wm. C. Keen | Pennsylvania. |
| C. L. Kelleher | Pennsylvania. |
| Chas. O. Kennedy | Missouri. |
| Nettie L. Knepp | Pennsylvania |
| L. G. Koenig | Pennsylvania. |
| Clara J. Kretschman | Pennsylvania. |
| Irva Lu Ella Kuter | Illinois. |
| Emil Lanz | Switzerland. |
| J. B. Lewin, B.A. | South Africa. |
| F. H. Lloyd | Pennsylvania. |
| G. F. Logan | Nova Scotia. |
| H. W. Lyte | Pennsylvania. |
| G. C. McBride | Pennsylvania. |
| J. J. McLaughlin | Massachusetts. |
| Wm. H. Manning | Pennsylvania. |
| Oscar Maul | Pennsylvania. |
| Chas. Nair | Pennsylvania. |
| T. L. Napton | Montana. |
| H. C. Neale | Pennsylvania. |
| Reinhard W. Nell | Pennsylvania. |
| Jno. T. Nicholson | Canada. |
| W. H. Norris | Pennsylvania. |
| W. M. Nyer | Pennsylvania. |
| W. L. Off | Pennsylvania. |
| H. I. Oliver | New York. |
| W. A. Parker | Pennsylvania. |
| W. H. Perdue | Canada. |
| G. A. Pineda | South America. |
| Oswaldo Pochet | San Domingo. |
| Chas. C. Rowe | Canada. |
| Jno. T. Rugh | Pennsylvania. |
| C. S. Saylor | Pennsylvania. |
| S. E. Schriner | Pennsylvania. |
| Anna Scott | Pennsylvania. |
| P. L. Showers | Pennsylvania. |
| M. G. Silvis | Pennsylvania. |
| Jos. A. Smith | Massachusetts. |
| Wm. A. Smith | Pennsylvania. |
| Gustav Stanetzky | Germany. |
| C. C. Sticker | Pennsylvania. |
| E. F. Stratford | Pennsylvania. |
| Catharine Sweeney | Pennsylvania. |
| H. W. Tate | Pennsylvania. |
| S. S. Theller | California. |
| E. L. Thomas | Missouri. |
| W. A. Thomas | Missouri. |
| F. S. Thome | Missouri. |
| C. H. Tillinghast | New York. |
| G. B. Varwig | Pennsylvania. |
| W. Matlack Ward | Pennsylvania. |
| G. N. E. Wardrop | Canada. |
| R. B. Webb | Pennsylvania. |
| H. T. Wells | Missouri. |
| J. E. Williamson | Pennsylvania |
| C. R. Wintersteen | Pennsylvania. |

## KANSAS CITY DENTAL COLLEGE.

THE sixteenth annual commencement exercises of the Kansas City Dental College were held in the Coates Opera House, Kansas City, Mo., on Tuesday, April 5, 1898.

The faculty address was delivered by Professor R. T. Sloan, A.M., M.D., and the salutatory by T. M. Cockrill, D.D.S.

The degree of D.D.S. was conferred on the following graduates by A. H. Thompson, D.D.S., president of the faculty:

| NAME. | STATE. | NAME. | STATE. |
|---|---|---|---|
| Adelbert D. Ames | New York. | Wm. B. McCrary | Kansas. |
| Geo. A. Baker | Kansas. | Tracy M. Payfair | Missouri. |
| Thos. M. Cockrill | Missouri. | Thos. B. Ramsey | Missouri. |
| Francis M. Caldwell | California. | Earl W. Shrock | Missouri. |
| O. O. S. Charlston | Kansas. | W. E. Schumann | California. |
| Wm. E. Dodds | South Dakota. | Richard M. Seibel | Missouri. |
| John A. Dampf | Missouri. | W. D. Shackelford | Texas. |
| Geo. A. Esterly | Ohio. | Jas. E. Shewmaker | Missouri. |
| Benj. L. Foster | Illinois. | Henry M. Waters | Iowa. |
| Frank A. Glasscock | California. | Geo. W. Ward | Kansas. |
| Earl A. Henderlider | Kansas. | Styles W. Wherry | Kansas. |
| James E. Hardy | Kansas. | Benedict G. Wenker | Missouri. |
| Emil M. Kapitan | Wisconsin. | Edouardo P. Wheeler | Kansas. |
| Andrew F. Kerns | Kansas. | Dixon H. Woods | Kansas. |
| Ed. A. Miller | Missouri. | Fred. M. Yingling | Kansas. |
| Edw. T. McDowell | Missouri. | John C. Yager | Ohio. |

## CINCINNATI COLLEGE OF DENTAL SURGERY.

THE annual commencement exercises of the Cincinnati College of Dental Surgery were held in the Auditorium, Cincinnati, Ohio, on Tuesday evening, April 12, 1898.

The annual address was delivered by Professor G. S. Junkerman, M.D., D.D.S., dean of the college, and the valedictory by Rev. Charles F. Goss.

The number of matriculates for the session was eighty-nine.

The degree of D.D.S. was conferred on the following graduates by Hon. Francis B. James, LL.B., president of the board of trustees:

| NAME. | STATE OR COUNTRY. | NAME. | STATE OR COUNTRY. |
|---|---|---|---|
| R. T. Cisler | Ohio. | Hanna Hurvitz | Russia. |
| D. G. Davidson | West Virginia. | Walter C. Jones | Ohio. |
| Harry L. Davis | Ohio. | Chas. T. Meyer | Ohio. |
| W. F. Eagleson | Ohio. | Harry C. Murphy | Indiana. |
| John H. Francis | Ohio. | Lucian Q. Nelson | Kentucky. |
| Robert J. Hanran | Canada. | John Pfannstiel | Ohio. |
| Oscar S. Heineman | Ohio. | Albert C. Stamm | Ohio. |
| Elmer B. Hosom | Ohio. | John R. Smyth | Indiana. |
| Herman B. Hune | Ohio. | I. A. Winston | Ohio. |

## CHICAGO COLLEGE OF DENTAL SURGERY.

THE sixteenth annual commencement exercises of the Chicago College of Dental Surgery (Dental Department of Lake Forest University) were held in Central Music Hall, Chicago, Ill., on Wednesday afternoon, April 6, 1898.

The doctorate address was delivered by Truman W. Brophy, M.D., D.D.S., LL.D., and the valedictory by Guy Lawrence Bergen, D.D.S.

The degree of D.D.S. was conferred on the following graduates by Truman W. Brophy, M.D., D.D.S., LL.D., president of the college:

Elmer K. Adams.
William S. Adair.
George W. Aldrich.
Hugh F. Armstrong.
Squire A. Arnold.
Frederick Brethour.
James A. Bell.
Fay G. Babcock.
William H. Barricklow.
Frank B. Bassett.
Adelbert C. Baur.
Guy L. Bergen.
Alfred W. Berger.
Jacob Bloomenthal.
King Brooks.
Stephen W. Brundage.
C. Arthur Bourn.
John P. Buckley, Ph.G.
David C. Budge.
George B. Bunyan.
Joseph I. Bush.
Thomas C. Campbell.
Thomas F. Campbell.
Will A. Cann.
Jonas F. Canode.
William J. Charters.
William G. Coffey.
Ralph E. Collins.
Oscar H. Cole.
Martin J. Conley.
Frederick D. G. Cook.
Robert C. Corbus.
LeGrand M. Cox, Jr.
George T. Cress.
Thomas E. Crowley.
Joseph P. Cruise.
Robert J. Cruise.
George W. Cunningham
Myron E. Curtiss.
John W. Daniels.
Lawrence C. Doherty.
Joseph T. Davies, M.D.
Frank H. Davis.
Ira F. Dillman.
James T. Doherty.
William M. Dolan.
Ernest W. Draver.
George Drury.
Hiram E. Eells.
Elmer W. Elliott.
Harry V. Epperson.
John W. Epperson.
Charles H. Evans.
Harry L. Foster.
James D. Fair.
Jesse Filmar.
Christian C. Fleischer.
James F. Flynn.
Albert W. Fossum.
Harry A. Foster.
Frank Freymann.
Vernon M. Gregg.
Edwin L. Garrett.
Louis A. Gebhardt.
George W. Geenty.
Edward D. George.
Elmer G. Gibson.
Walter C. Golbeck.
Thomas F. Gorman.
George Gow.
George N. Green.
Carl J. Grove, Ph.G.
Thomas L. Grisamore.
Oliver H. Harden.
Andrew J. Harris, Jr.
Norman B. Hall.
John A. Heaton.
Carl Heper, Ph.G.
John N. Higgins.
Jesse L. Hitz.
E. Everett Holden.
Frank J. Hoeschler.
Julius L. Holton.
Samuel R. Hopkins.
George W. Humpidge.
A. C. Hutchison, Jr.
Charles H. Jefferis.
Fred L. Jenkins.
Albert A. Jessup.
William Kamin.
Edwin A. Kartack.
Oscar M. Kenck, M.A.
Friend B. Kenward.
Warren S. Kern.
John W. Kleeber.
David E. Kulp.
Frank Kyle.
Peter P. Lobig.
Edward E. Lamberton.
Leo H. Lawson.
Noah A. Lee.
Garret Lighthart.
Carl Lindstrom.
James D. Locke.
Thomas Lockie.
Charles J. Long, Jr.
J. W. H. Loppenthein, Phg.L., P.M., O.
Earl G. McAbery.
John F. Maloney.
Charlie R. Mead.
George W. C. Meyer.
Frederick G. Miller.
Gove L. Miller.
Frank D. Miner.
Rudolph A. Mittelstadt.
William J. Montgomery
William E. Moore.
John A. Morrison.
Peter A. McMillan.
Peter C. McNiff.
Joseph F. McParland.
William Mullin.
Walter L. Neil.
Ralph E. Nelson.
Charles W. Nerud.
Arthur B. Oren.
Royal H. Pierce.
Harry B. Parrish.
Clayton A. Patterson.
Roscoe B. Power.
Stephen E. Pettit.
Orren E. Phillips.
Robert E. Raleigh.
Edgar R. Riggs.
Clarence M. Rankine.
Charles F. Rockey.
Ellis M. Rogers.
Isaac N. Rosenbledt.
Marx Ruge.
William H. Sargent.
William A. Sebolt.
Frederick H. Shannon.
Henry A. Shannon.
Walter H. Schoening.
James M. Silvis.
Benjamin B. Sharp.
Richard C. Smith.
Bert L. Snashall.
Marc A. Southworth.
Alexander M. Sowler.
Burt Le R. Spellman.
Wilford C. Stryker, B.S
Carl Sholtz.
George E. Taylor.
Joseph H. Teter.
George W. Turner.
Joseph J. Volker.
Howard L. Waide.
Francis X. Walsh.
Albert O. Watland.
William E. Webster.
Ralph C. Williams.
Arthur C. Willman.

## BALTIMORE COLLEGE OF DENTAL SURGERY.

THE fifty-eighth annual commencement exercises of the Baltimore College of Dental Surgery were held in Ford's Opera House, Baltimore, Md., on Friday afternoon, April 1, 1898.

The annual oration was delivered by L. C. F. Hugo, D.D.S., and the valedictory by E. W. Gaynor, B.S., D.D.S.

The degree of D.D.S. was conferred on the following graduates by Professor M. W. Foster, dean of the college:

| NAME. | STATE OR COUNTRY. |
|---|---|
| R. T. Allen, B.A. | North Carolina. |
| H. B. Anderson | Canada. |
| J. E. W. Armstrong | Pennsylvania. |
| W. F. Baker | Pennsylvania. |
| W. N. Barnes | New York. |
| H. N. Bernard | New York. |
| A. C. Brewer | Pennsylvania. |
| H. R. Brightbill | Pennsylvania. |
| E. T. Byrne | Pennsylvania. |
| C. P. Calloway | West Virginia. |
| A. Chesterfield | Canada. |
| D. C. Clark | West Virginia. |
| G. Collins | Maine. |
| J. C. Conover | New Jersey. |
| F. del Valle | Porto Rico. |
| C. W. Duttman | West Virginia. |
| W. Doebbelin | Germany. |
| W. O. Dunning | New York. |
| O. W. Elzey | Maryland. |
| C. V. Emelio | Portugal. |
| S. Emmich | Mississippi. |
| J. P. Finn | Connecticut. |
| W. B. Fletcher | West Virginia. |
| E. W. Gaynor, B.S. | Massachusetts. |
| B. J. Gorman | Maryland. |
| F. P. Gormley | Rhode Island. |
| J. K. Grisham | Tennessee. |
| G. Hain | Pennsylvania. |
| G. F. Herring | North Carolina. |
| G. A. Hitch | Delaware. |
| W. G. Huntley, B.S. | Vermont. |
| C. E. Johnson | Virginia. |
| J. M. Kelly | New York. |
| R. E. Koehler | Texas. |
| F. A. Lefurgey | P. E. Island. |
| H. M. Lever | Canada. |
| G. Loeffler | Maryland. |
| C. E. Lutz | Ohio. |
| C. B. McElrath | West Virginia. |
| M. H. McElroy | Rhode Island. |
| A. R. McLaughlin | North Carolina. |
| C. H. Merritt | Maine. |
| H. G. Morgan | Ohio. |
| J. H. Morrison | Ohio. |
| C. R. Morton | Nova Scotia. |
| P. Nixon | Alabama. |
| H. D. Osborne | Georgia. |
| T. O. Palmer | New York. |
| M. E. Parsons | Maryland. |
| M. L. Perez | Cuba. |
| E. A. Poe | Texas. |
| E. R. Rhein | Pennsylvania. |
| C. R. Riddick | North Carolina. |
| W. C. Richardson | Louisiana. |
| T. J. Ritter | Texas. |
| V. A. Roach | Nova Scotia. |
| C. M. Ryan | New York. |
| G. E. Seay | Virginia. |
| R. M. Sentz | West Virginia. |
| M. S. Shoemaker | Pennsylvania. |
| B. P. Simpson | Massachusetts. |
| H. E. Smith | Pennsylvania. |
| C. W. Straight | New York. |
| A. P. Sylvia | Portugal. |
| P. W. Tankard | Virginia. |
| W. O. Throop | New York. |
| W. L. Thwaits | New York. |
| C. H. Tice | New York. |
| O. J. Toujan | Louisiana. |
| D. L. Towberman | Virginia. |
| W. Wade | Maryland. |
| O. E. Wall | Honolulu. |
| C. A. Wood | Pennsylvania. |
| W. Wolf, M.D. | Maryland. |

## NORTHWESTERN UNIVERSITY DENTAL SCHOOL.

THE annual commencement exercises of the Northwestern University Dental School were held in the Grand Opera House, Chicago, Ill., on Tuesday afternoon, April 5, 1898.

The salutatory address was delivered by Mr. John L. Wagner, the doctorate address by W. T. Eckley, M.D., and the valedictory by Charles A. Young, D.D.S.

The degree of D.D.S. was conferred on the following graduates by Henry Wade Rogers, LL.D., president of the university:

Holson Allen.
Herbert E. Algeo.
Edwin J. Albrecht.
Robert T. Aiston.
Clarence A. Atwood.
George B. Atchinson.
Louis E. Badgley.
Fred P. Barnhart.
Walter A. Brown.
George C. Brandt.
Arthur S. Bayne.
Henry C. Brock.
Clara F. Brundage.
G. H. Bridgman, D.D.S.
Frank E. Burnett.
Louis E. Blackaller.
Alexander J. Bell.
George H. Beidler.
Frank H. Bimrose.
Clara C. Beck.
John E. Burgan.
Claude P. Banning.
Arthur W. Beach.
Thomas J. Boyce.
Samuel B. Crawford.
Harry Copley.
Frank Curtis.
Robert I. Coles.
John C. Conniff.
Charles M. Clough.
Oscar Carrabine.
George W. Darnell.
James C. Davis.
Benjamin F. Dowell.
Leslie G. Derrick.
Walter F. Dorsey.
Walter K. Delano.
Ulysses F. DeVries.
Clyde S. Demorest.
Lewis M. Ellis.
Herman W. Elliott.
William C. Eustice.
Harry F. Echternacht.
Lewis C. Edison.
Carroll R. Eaton.
Herman L. Frankel.
Roger L. Fellows.
William F. Froeschle.
Frank N. Freemire.
Van E. Freeman.
John H. Fowler.
Albert M. Ford.
Carlton M. Garrett.
Nathaniel L. Garling.
Willis M. Graham.
William R. Gibson.
Arthur C. Grotewohl.
Frederick Graflund.
Harry Gulmyer.
James Grove.
Charles H. Godward.
Francis Hayes.
William J. Hopf.
Alice C. Hunter.
Charles B. Hess.
Francis E. Heacox.
Rudolph G. Hunn.
Clemens Huberty.
Geo. H. Hillenbrand.
Walter L. Hollenbeck.
Clark G. Hibbard.
Turner B. Hollenbeck.
Almont C. Hixon.
James H. Haight.
Arthur V. Hargett.
Norman H. Hunter.
Harry Hoare.
Clark K. Hartzell.
Lloyd R. Hawley.
Harry R. Isenhower.
Arthur L. Inglesby.
Glyde W. Johnson.
Walter W. Johnson.
J. DeWolf Jackson.
Walter H. Jackson.
John R. Jones.
Sherman Keyser.
Gertrude Kniewel.
Conrad F. Krenwinkel.
John H. Kennedy.
Chas. E. Klopp.
Ray D. Kellogg.
Chas. H. Lawson.
Charles S. Leininger.
Olof Lange.
Frederick S. Lawrence.
James J. Leonard.
Ralph E. Libberton.
Earnest J. Morgan.
James W. Madden.
Frank M. Metzgar.
Geo. W. Minium.
Burt M. Mott.
Shane A. Morgan.
Royal B. Munn.
Theodore H. Mentague.
Ebbin A. Meservey.
William E. Morris.
Samuel W. McNinch.
Frank E. McDermott.
John McIntyre.
Robert P. Neil.
Joseph J. Onthank.
Wiley L. Overholser.
Katie D. Prothero.
Mary Peak.
Houghton Peck.
Geo. M. Perry.
Walter S. Padget.
Ross T. Parshall.
Emerson J. Prettyman.
Raymond C. Quick.
Homer E. Robison.
Geo. M. Russel.
Fred T. Rench.
Chas. N. Reese.
William F. Rimes.
Milo E. Ratliff.
George R. Richardson.
Fred A. Reisacher.
Harry R. Risinger.
Theodore H. Rath.
Edward F. Rowell.
Guy M. Ruff.
Fletcher C. Rood.
Isaac E. Reid.
Forrest D. Reed.
James M. Snow.
Harry L. Shupert.
Aaron J. Shepherd.
L. Langdon Sheffield.
Charles Schlotfeldt.
Dan. P. Scott.
Madge L. Schaum.
Jas. H. Shields, D.D.S.
Lucien W. Strong.
Wm. A. Stephenson.
John J. Sulberger.
Chas. W. Stoufer.
Wilbert S. Sweet.
Walter C. Taylor.
John T. Taylor.
Arthur C. Tucker.
Clarence C. Thomas.
Henry G. Trent.
Burton M. Tunison.
John VanDyke.
Charles D. Whitcomb.
Geo. W. Wilson.
Guy F. Wait.
Chas. R. Wheeler.
John L. Wagner.
Miles E. Walton.
Harry C. Wood.
Chas. S. Wicklin.
Franklin F. Wing.
Thomas P. Wise.
James B. Watts.
Daniel W. Wickham.
Samuel E. Wallace.
Clarence A. Webb.
John H. Wallace.
Frederick V. Williams.
Harry K. Williams.
Thos. B. S. Wallace.
Chas. A. Young.

## WESTERN DENTAL COLLEGE.

THE eighth annual commencement exercises of the Western Dental College were held in the Coates Opera House, Kansas City, Mo., on Saturday evening, April 2, 1898.

The annual address was delivered by Rev. J. M. Cromer, and the faculty address by Dr. T. H. Cunningham.

The degree of D.D.S. was conferred on the following graduates by Dr. D. J. McMillen, dean of the faculty:

| NAME. | STATE OR COUNTRY. | NAME. | STATE OR COUNTRY. |
|---|---|---|---|
| M. L. Beason | Missouri. | S. Locke | New Mexico. |
| C. P. Becker | Virginia. | Edwin Marshall | Missouri. |
| Augusta H. Brady | Sweden. | R. F. McCreery | Missouri. |
| Harry M. Cannon | Missouri. | C. W. Middleton | Missouri. |
| F. G. Chamblin | Missouri. | F. B. Miller | Missouri. |
| G. C. Cleveland | Illinois. | R. M. Minter | Missouri. |
| C. L. Cleveland | Illinois. | J. D. Moore | Kansas. |
| T. F. Clifford | Missouri. | W. G. Owen | Kansas. |
| Levi Cook | Missouri. | R. S. Parsons | Missouri. |
| Emmett Craig | Missouri. | Ernest Peterson | Kansas. |
| E. P. Dameron | Missouri. | J. H. Rhodes | Kansas. |
| L. C. Frazier | Missouri. | T. H. Richmond | Missouri. |
| G. A. Gruebbel | Missouri. | F. S. Robison | Missouri. |
| C. J. Hamilton | Iowa. | G. R. Rose | Missouri. |
| R. W. Hammons | Idaho. | G. L. Rosier | Missouri. |
| Glea Harvey | Missouri. | Herman Schneider | Kansas. |
| W. C. Hensley | Wyoming. | Chas. Skinner | Kansas. |
| W. E. Huffman | Missouri. | F. R. Souders | Kansas. |
| S. W. Hurlburt | Kansas. | Harry Stinson | Missouri. |
| C. R. Hubbell | Missouri. | Henry Toelle | Missouri. |
| F. B. Jahr | Missouri. | H. D. Wherritt | Missouri. |
| T. W. Keel | Illinois. | H. P. White | Iowa. |
| T. W. Kelton | Missouri. | H. G. Whittlesey | Kansas. |
| W. B. Kenney | Missouri. | F. B. Wiesner | Kansas. |
| R. C. Korff | Missouri. | A. J. Williams | Illinois. |
| R. L. Krueger | Missouri. | E. B. Winslow | Missouri. |
| E. A. Litchfield | Missouri. | | |

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## PHILADELPHIA DENTAL COLLEGE.

THE thirty-fifth annual commencement exercises of the Philadelphia Dental College were held in the Academy of Music, on Friday evening, April 1, 1898.

The address to the graduates was delivered by Professor L. Greenbaum, M.D., D.D.S., and the valedictory by Wm. P. Devine, D.D.S.

The degree of D.D.S. was conferred on the following graduates:

| NAME. | STATE OR COUNTRY. | NAME. | STATE OR COUNTRY. |
|---|---|---|---|
| James H. Abbott | Delaware. | W. L. Birmingham | Pennsylvania. |
| James W. Allen | Pennsylvania. | Will A. Blackburn | Texas. |
| Henry R. Arends | Nebraska. | Frank L. Booth | New York. |
| J. H. P. Armatage | Canada. | Shirley W. Bowles | New York. |
| Louis Back | New York. | Sylvan Brautman | Roumania. |
| Cassius M. Barns | Pennsylvania. | Wm. F. Browning | California. |
| Stephen S. Benson | New York. | Claude Brown | Canada. |
| H. H. Bethel, A.B. | Pennsylvania. | Henry S. Brown | Canada. |
| Sidney H. Bigler | Pennsylvania. | Wallace W. Bruce | Canada. |

| NAME. | STATE OR COUNTRY. |
|---|---|
| R. P. Buckley | Massachusetts. |
| Thomas J. Byrne | Pennsylvania. |
| William H. Cahill | Connecticut. |
| J. C. Campbell | Canada. |
| Thomas J. Carrier | Connecticut. |
| Noemi Chabut | France. |
| William C. Chinn | Canada. |
| Louis K. Cleaver | Pennsylvania. |
| John A. Clifford | Rhode Island. |
| John Common | New York. |
| V. F. Cunningham | Canada. |
| William P. Devine | Vermont. |
| Chas. H. Doering | Oregon. |
| J. H. Donaldson | Pennsylvania. |
| Harry G. Dunbar | Canada. |
| H. S. Du Vernet | Australia. |
| Thomas J. Egan | Minnesota. |
| Irwin M. Eisaman | Pennsylvania. |
| Rupert W. Elvy | Australia. |
| Harry A. Erwin | Pennsylvania. |
| Frank B. Evans | Iowa. |
| D. G. Farrington | New Jersey. |
| John P. Fellows | Kansas. |
| Bertram C. Fern | Pennsylvania. |
| L. W. Fischer | California. |
| John C. Fox | Pennsylvania. |
| H. O. Frederick | Ohio. |
| C. E. Freeman | Maine. |
| Harry B. Garrison | Maine. |
| George E. Girard | New York. |
| John A. Glenzer | New York. |
| H. M. Goodwin | Canada. |
| Robert B. Green | New York. |
| Joseph Grice | England. |
| Almon E. Hamlin | Connecticut. |
| William G. Hand | New Jersey. |
| Walter S. Hart | Connecticut. |
| A. H. Henderson, Jr. | Pennsylvania. |
| Geo. W. Hinkson | Pennsylvania. |
| John P. Hines | California. |
| Harry A. Hurd | Iowa. |
| W. B. Hutchens | New York. |
| Richard Jeffries | Pennsylvania. |
| Miles L. Johnson | Pennsylvania. |
| M. Joseph, D.E.D.P. | France. |
| John D. Kelly | Pennsylvania. |
| Sydney Kerr | Canada. |
| Lottie M. Kidder | Massachusetts. |
| Amalie Klonower | Germany. |
| L. E. Knobeloch | South Carolina. |
| George C. Knorr | Pennsylvania. |
| A. M. Lafayette | Canada. |
| W. E. F. Landers, Jr. | Connecticut. |
| James E. Lang | California. |
| Gaylord Lansdowne | Missouri. |
| A. Van H. Lewis | Pennsylvania. |
| P. D. Luxemburger | Pennsylvania. |
| Sarah J. Mace | New York. |
| A. H. MacTaggart | Australia. |
| J. M. Mackie | Scotland. |
| W. W. McClarin | Pennsylvania. |
| R. H. McCready | Maine. |
| E. D. McLeod | Connecticut. |
| H. J. McNaughton | Canada. |
| W. L. McWilliams | Pennsylvania. |
| Roy L. Magoon | Minnesota. |
| George L. Markle | Pennsylvania. |
| Geo. A. Marshall | Oregon. |
| Lloyd L. Means | Pennsylvania. |
| Jos. P. Monahan | Massachusetts. |
| Charles S. Moon | New York. |
| Fred. J. Moon | New York. |
| Alfred C. Nathan | Australia. |
| John J. Needham | Pennsylvania. |
| Gleni C. Newcom | Pennsylvania. |
| L. G. Nickerson | Pennsylvania. |
| Alvarez Nugent | Canada. |
| Fred. R. Ogden | California. |
| Frank C. Parsons | Connecticut. |
| Alex. Paterson | Australia. |
| Jno. W. Pinkham | Pennsylvania. |
| R. B. Pollock, Jr., M.D., Ph.G. | Pennsylvania. |
| C. W. Powers | Canada. |
| C. O. Regener | New York. |
| John A. Reidy | Pennsylvania. |
| Edw. S. Roberts | North Carolina. |
| Walter F. Rogers | Pennsylvania. |
| V. M. Rundle | New Jersey. |
| Harry N. Sackett | New York. |
| Frank Sanbern | New York. |
| Albert E. Seal | Rhode Island. |
| M. I. S. Schenck | Pennsylvania. |
| W. G. Seeley | Pennsylvania. |
| Frank W. Senior | Massachusetts. |
| William N. Short | Australia. |
| Wm. C. Showalter | Pennsylvania. |
| C. G. Skinner | California. |
| Carlos E. Smith | Pennsylvania. |
| Edw. D. Sparke | Australia. |
| Moore Stevens | Pennsylvania. |
| Jos. V. St. Martin | Louisiana. |
| Stanton A. Stuart | Ohio. |
| E. E. Sullivan | Massachusetts. |
| Charles E. Swain | Connecticut. |
| J. Edward Tether | New York. |
| Wm. H. Thomas | Maine. |
| S. W. Thornbury | Pennsylvania. |
| John H. Torrance | Massachusetts. |
| A. K. Tuttle, A.B. | Pennsylvania. |
| D. R. Van Amringe | California. |
| R. O. Van Deusen | New York. |
| A.N. Van Dyke, Ph.G. | Pennsylvania. |
| Chas. H. Van Kirk | New York. |
| John B. Vedder | Oregon. |
| A. L. Westcott | New Jersey. |
| William A. White | Pennsylvania. |
| Geo. B. Whitten | Maine. |
| Charles O. Wilkin | Pennsylvania. |
| F. H. Williams | New York. |
| George W. Wise | Pennsylvania. |
| W. H. Witham | Maine. |
| Geo. S. Writer, Jr. | New York. |
| Arthur Zentler | Roumania. |

## OHIO COLLEGE OF DENTAL SURGERY.

THE fifty-second annual commencement exercises of the Ohio College of Dental Surgery (Department of Dentistry of the University of Cincinnati) were held at the Odeon, Cincinnati, Ohio, on Thursday evening, April 5, 1898.

The annual address was delivered by Dr. W. O. Thompson, president of Miami University, and the class address by Charles E. Cook, D.D.S.

The number of matriculates was two hundred and six.

The degree of D.D.S. was conferred on the following graduates by Dr. D. W. Clancy, vice-president of the board of trustees:

| NAME. | STATE |
|---|---|
| James H. Arbuckle | Ohio. |
| John K. Bannister | Kentucky. |
| Adelbert W. Beard | Ohio. |
| Irvin R. Benner | Ohio. |
| Adalbert B. Binns | Georgia. |
| W. E. Blackburn | Ohio. |
| Eugene L. Blazer | West Virginia. |
| John W. Bonzo | Ohio. |
| Arthur Y. Boucher | Ohio. |
| Ernest E. Branch | Ohio. |
| Homer M. Brewer | Ohio. |
| H. A. Broering | Ohio. |
| W. B. Caldwell | Ohio. |
| Charles E. Cook | Ohio. |
| Charles F. Cooper | Ohio. |
| Stanley M. Copland | Michigan. |
| Herbert S. Curtis | Ohio. |
| Edw. M. Donahue | Iowa. |
| Fred. W. Everist | Ohio. |
| Frank B. Ford | Ohio. |
| T. W. Forshee, Jr. | Indiana. |
| Earl Gear | Indiana. |
| Robert L. Graves | Kentucky. |
| E. L. Griffin | Ohio. |
| Eugene I. Harlan | Ohio. |
| M. D. Hartinger | Ohio. |
| John B. Hodge | Ohio. |
| Charles O. Hook | Ohio. |
| Walter E. Jenny | Ohio. |
| Edw. T. Johnson | Ohio. |
| Miss F. L. Kaplan | Ohio. |
| Edward Kelley | Ohio. |
| Lewis C. King | Michigan. |
| Alfred J. Koelble | Ohio. |
| L. B. Longenecker | Ohio. |
| H. K. McCulloch | Pennsylvania. |
| Frank McLean | Ohio. |
| Roy B. Meek | Ohio. |
| William R. Meeker | Indiana. |
| Edward H. Meyer | Indiana. |
| Jno. R. Molyneaux | Ohio. |
| Elmor E. Morris | Ohio. |
| Marion E. Myers | Ohio. |
| William M. Myers | Kentucky. |
| Robert C. Pollitt | Kentucky. |
| Joseph W. Prichard | Indiana. |
| Joseph M. Ratliff | Ohio. |
| William C. Rice | Illinois. |
| Ottis P. Robinson | Indiana. |
| Jacob W. Rohrer | Ohio. |
| Herman E. Rose | Kentucky. |
| Ira H. Scott | Ohio. |
| William H. Sells | Ohio. |
| Rudolph Siegel | Ohio. |
| L. G. Singleton | Pennsylvania. |
| John S. Stewart | Indiana. |
| S. W. Taliaferro | Kentucky. |
| George F. Thomas | Ohio. |
| O. A. Thompson | Ohio. |
| Guy B. Tuthill | Michigan. |
| Charles V. Vicroy | Kentucky. |
| Geo. H. Williamson | Ohio. |
| Charles W. Wilson | Michigan. |
| Cary A. Wisecup | Ohio. |
| Wier M. Wood | Pennsylvania. |
| Z. N. Wright | Ohio. |

## ATLANTA DENTAL COLLEGE.

THE annual commencement exercises of the Atlanta Dental College were held in the Grand Opera House, Atlanta, Ga., on Tuesday evening, March 29, 1898.

Professor William Crenshaw read his report as dean of the college, and the valedictory address was delivered by John C. Richard, Jr., D.D.S.

The number of matriculates for the session was one hundred and eighty-five.

The degree of D.D.S. was conferred on the following graduates by Judge W. R. Hammond:

| NAME. | STATE OR COUNTRY. |
|---|---|
| W. B. Alford | South Carolina. |
| W. W. Allen | Georgia. |
| B. R. Anderson | North Carolina. |
| J. C. Anderson | Georgia. |
| H. C. Bazemore | Tennessee. |
| T. E. Barker | Alabama. |
| J. W. Black | Florida. |
| J. M. Brannon | Georgia. |
| L. D. Baggs | Georgia. |
| R. L. Branyon | South Carolina. |
| L. A. Brewster | Louisiana. |
| P. E. Callihan | North Carolina. |
| J. G. Caldwell | Mississippi. |
| P. T. Dashwood | England. |
| W. H. Elder | Georgia. |
| G. Enloe | Florida. |
| W. G. Ford | Georgia. |
| Theo. Foster | Connecticut. |
| H. Griffin | Georgia. |
| B. E. Goolsby | Georgia. |
| J. E. Gachet | Alabama. |
| O. P. Goodman | Georgia. |
| R. B. Hill | Georgia. |
| W. T. Herndon | North Carolina. |
| I. M. Hair | South Carolina. |
| C. B. Hall | North Carolina. |
| R. F. Ingram | Georgia. |
| T. P. Jones | Georgia. |
| E. L. Johnston | Mississippi. |
| J. I. Lee | Alabama. |
| P. W. Lea | Louisiana. |
| F. C. Latham | Florida. |
| H. L. Meldrim | Georgia. |
| M. M. Minter | Georgia. |
| H. M. Moore | Georgia. |
| Henry Moore | Georgia. |
| F. W. McCracken | North Carolina. |
| E. A. McMillan | South Carolina. |
| L. E. McTyre | Georgia. |
| L. B. McLaurin | Mississippi. |
| N. J. Naul | Mississippi. |
| L. D. Owen, M.D. | Tennessee. |
| J. L. Pope | Mississippi. |
| J. A. Peterson | Georgia. |
| R. H. Park | Georgia. |
| C. E. Pittman | Georgia. |
| W. A. Park | New York. |
| J. D. Regan | North Carolina. |
| S. B. Raby | Texas. |
| J. C. Richard, Jr. | Florida. |
| G. T. Sharpton | South Carolina. |
| G. W. Shackelford | Georgia. |
| R. G. Shanks | Alabama. |
| W. T. Simmons | Indiana. |
| H. E. Satterfield | North Carolina. |
| H. P. Teague | South Carolina. |
| J. B. Tiller | Florida. |
| H. C. Terry | New York. |
| T. A. Terrell | Georgia. |
| F. C. Watson | Louisiana. |
| J. H. White | Louisiana. |

## COLUMBIAN DENTAL COLLEGE.

THE annual commencement exercises of the Columbian Dental College were held at Handel Hall, Chicago, Ill., on Tuesday afternoon, April 5, 1898.

The annual address was delivered by Rev. J. W. Fifield, and the valedictory by Louis C. Neeb, D.D.S.

The degree of D.D.S. was conferred on the following graduates by George T. Carpenter, M.D., D.D.S., president of the college:

Arthur J. Anderson.
Benjamin J. Baskerville.
Omar H. Banta.
Grant Craig.
Richard B. Davenport.
D. Lawrence Frazee.
Lewis E. Fisher.
Edward V. Harraman.
Ambrose J. Knetzger.
Louis C. Neeb.
Charles A. Schulz.
Louis C. Wagner.
Munson L. Ward.
L. Linville Whitt.

## UNIVERSITY OF MARYLAND—DEPARTMENT OF DENTAL SURGERY.

THE annual commencement exercises of the Department of Dental Surgery of the University of Maryland were held in Music Hall, Baltimore, Md., on Thursday evening, March 31, 1898.

The address to the graduates was delivered by Rev. H. W. Wharton, D.D., and the class oration by Adelard J. Harper, D.D.S.

The number of matriculates for the session was two hundred and seven.

The degree of D.D.S. was conferred on the following graduates by Bernard Carter, Esq., provost of the university:

| NAME. | STATE OR COUNTRY. |
|---|---|
| Wm. E. Anderson | South Carolina. |
| Charles E. Beall | Virginia. |
| Fred H. Brown | Vermont. |
| Martin Buhtz | Germany. |
| E. L. Burroughs | Maryland. |
| Benj. F. Carpenter | New York. |
| Le Roy J. Conger | Canada. |
| Halla F. Chapman | Kansas. |
| Franklin E. Clark | New York. |
| Ernest J. Cooke | Panama, S. A. |
| Claude S. Daly | New York. |
| Edw. B. Dawson | New York. |
| A. van K. Deekens | Maryland. |
| Clayton C. Eyler | Pennsylvania. |
| Welty B. Fahrney | Virginia. |
| L. W. Farinholt | Virginia. |
| Charles E. Fording | Ohio. |
| H. W. Freeman | Illinois. |
| R. T. Gallagher | North Carolina. |
| O. E. Gregoire | Rhode Island. |
| Joseph B. Grom | New Jersey. |
| Abr. Grunberg | Roumania. |
| E. C. Hamilton | Virginia. |
| G. N. Hardesty | Virginia. |
| F. R. Harkinson | California. |
| Adelard J. Harper | Massachusetts. |
| Pleasant S. Hays | Ohio. |
| C. D. Holmes, Jr. | Texas. |
| John H. Judd | North Carolina. |
| Jesse E. Judd | North Carolina. |
| Clinton M. Koontz | Maryland. |
| Chas. W. Leonard | New Jersey. |
| Thomas S. Lewis | Pennsylvania. |
| Pierre A. Michel | Louisiana. |
| M. B. Milner | Georgia. |
| Robert F. Moore | Pennsylvania. |
| Matt. McAndrew | Ontario, Can. |
| T. W. McFadden | Pennsylvania. |
| Fred'k C. McKee | Quebec, Can. |
| W. H. Nichols | New Hampshire. |
| W. T. Palmer | Iowa. |
| D. Lee Peacock | Georgia. |
| D. Irvel Pletcher | Ohio. |
| Joseph T. Pyles | Maryland. |
| F. W. H. Quinlan | New York. |
| B. C. Redfearn | North Carolina. |
| Montell B. Rudd | Virginia. |
| Luther T. Smith | North Carolina. |
| C. L. Smither | Virginia. |
| V. D. Shaffner | Nova Scotia. |
| G. A. Sprinkel, Jr. | Virginia. |
| Albert H. Ston | New York. |
| Earl Z. Stafford | Texas. |
| R. W. Taggart | Vermont. |
| Charles A. Terry | West Virginia. |
| Robt. L. Thacker | West Virginia. |
| Edwin P. Tignor | Virginia. |
| Geo. H. Trump | Maryland. |
| G. M. Warrenfels | Maryland. |
| Thomas J. Walsh | Vermont. |
| L. A. White | Dist. of Columbia. |
| Ed. R. Williams | Pennsylvania. |
| W. E. Williams | West Virginia. |
| Joseph E. Wright | Maryland. |

## TENNESSEE MEDICAL COLLEGE—DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the Tennessee Medical College were held in Staub's Opera House, Knoxville, Tenn., on Tuesday evening, March 29, 1898.

The annual address was delivered by Rev. James A. Duncan, D.D., and the charge to the graduates by Dr. J. C. Cawood.

The number of matriculates for the session was fourteen.

The degree of D.D.S. was conferred on the following graduates by Professor J. T. Henderson, A.M., president of the board of trustees: E. M. Caffey, North Carolina; James L. McCarty, Kentucky; R. C. Lowrance, North Carolina; A. Brooks, Tennessee; W. C. Mayr, Kansas.

## MEHARRY MEDICAL COLLEGE—DENTAL DEPARTMENT.

THE twelfth annual commencement exercises of the Dental Department of Meharry Medical College (Central Tennessee College) were held in the Gospel Tabernacle, Nashville, Tenn., on Thursday, February 3, 1898.

The valedictory address was delivered by Thomas N. Harris, D.D.S.

The number of matriculates for the session was nineteen.

The degree of D.D.S. was conferred on the following graduates by Rev. J. Bradin, D.D., president of the college: R. H. Cobb, Georgia; T. N. Harris, Alabama; G. W. Macker, South Carolina; J. E. Redmond, Tennessee.

## MARION-SIMS COLLEGE OF MEDICINE—DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the Marion-Sims College of Medicine were held in the Fourteenth Street Theater, St. Louis, Mo., on Saturday evening, April 9, 1898.

The address to the graduates was delivered by Dr. Theodore Menges.

The number of matriculates for the session was seventy-five.

The degree of D.D.S. was conferred on the following graduates by Y. H. Bond, M.D., dean of the college:

| NAME. | STATE. |
|---|---|
| Samuel T. Bassett | Missouri. |
| Edmund N. Beall | Missouri. |
| Herman H. Born, M.D. | Missouri. |
| Oscar L. Bumiller | Missouri. |
| Wm. L. Cripliver | Missouri. |
| Chas. H. Downing | Illinois. |
| Alvin Godejohann | Illinois. |
| Roland B. Harvey | Kansas. |
| Walter Hopkinson | Illinois. |
| Lawrence W. Mrazek | Missouri. |
| David Osterheld, Jr. | Missouri. |
| Richard L. Parrish | Missouri. |
| Harold G. Powell | Illinois. |
| Harry A. Rathbun | Kansas. |
| Jos. C. Reader | Illinois. |
| Frank LeR. Tucker | Illinois. |

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# DENTAL SOCIETY ANNOUNCEMENTS.

## NATIONAL DENTAL ASSOCIATION.

BY request of the president of the National Dental Association, attention is here called to the following section of the by-laws relating to the appointment and qualifications of delegates:

Article III, Section 3. All delegate members shall be practitioners of dentistry. They shall be received only from permanently organized state dental societies. They shall be elected by ballot at some regular meeting of their society, and shall be members who have done meritorious work for the profession; but no person shall be received as a delegate who is in arrears for dues to this association.

Also Article IV, Section 1. Each state society may send one for every ten of its active members as delegates to this association for one year, upon complying with the requirements of its constitution; but no society shall be entitled to representation that does not adopt or substantially recognize the Code of Ethics of this association.

The fact that the American Dental Association received delegates from both local and state societies renders it necessary to call attention to the fact that delegates to the National Dental Association will be accepted only from the state societies, and that such delegates must be elected by ballot at a regular meeting of the society.

EMMA EAMES CHASE, *Cor. Sec.*,
3364 Washington ave., St. Louis, Mo.

## MASSACHUSETTS DENTAL SOCIETY.

THE annual meeting of the Massachusetts Dental Society convenes at Mechanics' Building, Boston, June 1 and 2, 1898. This convention is expected to be one of the most successful in the history of the society. Extensive exhibits of material by the various supply houses, and completed operations, both in the mouth and on the model, by leading dentists and dental laboratories, will be an interesting feature. Information to prospective exhibitors upon application to

F. S. BELYEA, Brookline, Mass.,
*Chairman Com. on Hall and Exhibits.*

## UNION MEETING IN BALTIMORE.

THE second tri-union meeting of the Maryland State Dental Association, the Washington City Dental Society, and the Virginia State Dental Association will convene in Baltimore, June 2, 3, and 4, 1898, in the Dental Department of the Baltimore Medical College, corner Howard and Madison streets. Eminent practitioners from many states will be present to clinic and read papers. The profession cordially invited.

W. W. DUNBRACCO,
*Cor. Sec'y of the Md. Ass'n.*
1023 Edmondson avenue, Baltimore, Md.

## WASHINGTON STATE DENTAL SOCIETY.

THE Washington State Dental Society will convene at Tacoma on Monday, May 16, 1898, and continue for three days.

The State Dental Examining Board will be in session at the same time.

C. L. ERWIN, *Sec.*,
Seattle, Wash.

## COLORADO STATE DENTAL ASSOCIATION.

THE twelfth annual meeting of the Colorado State Dental Association will be held in Denver, June 7, 8, 9, and 10, 1898, in conjunction with the Stomatological Section of the American Medical Association.

An excellent program is assured. Those attending may avail themselves of reduced railroad rates. A cordial invitation is extended to all members of the profession.

ARTHUR C. WATSON, *Chairman Exec. Com.*,
Masonic Temple, Denver, Col.

## DENTAL COMMISSIONERS OF CONNECTICUT.

THE Dental Commissioners of Connecticut will meet in the Supreme Court rooms at the capitol in Hartford, Monday, May 16, 1898, at ten o'clock, to examine candidates for license and attend to all matters proper to come before them. Persons desiring to practice in this state must apply to the recorder for proper blanks, which they will fill out and return to him before the day of examination.

GEORGE L. PARMELE,
*Dental Commissioner and Recorder.*

## AMERICAN DENTAL SOCIETY OF EUROPE.

THE American Dental Society of Europe will hold its twenty-fifth anniversary meeting in London on August 2, 1898. Members of the profession are invited to be present. Those who desire to present papers or give demonstrations will please communicate the title of their contribution as soon as possible to the secretary, in order that it may be given a place on the program.

L. A. O'BRIEN, *Sec'y,*
15 Walpurgis Str., Dresden, Germany.

## NEW JERSEY STATE DENTAL SOCIETY.

THE twenty-eighth annual session of the New Jersey State Dental Society will be held at Asbury Park, commencing July 20, 1898, and continuing the 21st and 22d. The commodious and pleasant "Auditorium" has been secured for the sessions, with unlimited space for clinics and exhibits.

Papers and clinics from many eminent dentists have already been secured. Preparations are being made for the largest display of electrical appliances for use in dentistry ever given. Both 110- and 500-volt currents are attainable.

The Hotel Columbia, adjoining, has been secured as headquarters for members and visiting friends; rates will be $2.50 and $3.00 per day.

CHARLES A. MEEKER, D.D.S., *Sec'y.*
H. S. SUTPHEN, D.D.S., *Ass't. Sec'y.*

## TO NEW JERSEY DENTISTS.

NOTICE is here given that dentists who desire to become members of the State Society at the annual meeting at Asbury Park, July, 1898, will be enabled from this date to secure the necessary blanks and information, thereby saving time and securing the early action of the membership committee on all applications.

WILLIAM E. TRUEX, D.D.S., *Chairman Membership Committee,*
Freehold, N. J.

# EDITORIAL.

## THE PROPOSED AMENDMENT OF OUR PATENT LAWS.

THE dental profession of this country is already well informed of a movement set on foot by the Dental Society of the State of New York at the suggestion of its Correspondent, Dr. Ottolengui, having for its object a modification of our national laws governing the issuance of patents, which shall in effect prevent the patenting of any method or process for treating human diseases.

No question growing out of the legal restrictions which affect dental practice has so immediately concerned the material welfare of dental practitioners as that of so-called professional patents. The history of dentistry furnishes unnumbered evidences of the important bearings of the patent question upon her professional progress, and especially of the confusion of views arising from a lack of sufficient understanding of the question in all its aspects. A certain body of professional men have suffered from injustice legalized by our patent laws, and, because of the injustice which they realized, conceived that it was due to an inherent defect of the principle upon which our patent laws are founded; hence they assumed an attitude of antagonism toward patents in general, or at least so far as they related to professional practice, and stigmatized all who held contrary views as unprofessional.

Professional evolution in dentistry has, however, developed a broader and more accurate view, and, as a result, a better understanding of the patent question is now generally had, owing to the agitation of the subject which has been going on constantly for the past decade or more.

The most important step which can be made toward a satisfactory adjustment of any difficulty is a recognition of its exact nature and location, just as in the case of disease the essential prerequisite for its rational treatment is a correct and accurate diagnosis. It is safe to say that the diagnosis of the manner in which our patent laws have worked an injustice to dentists directly, and the public indirectly, is being made out, and the remedy must naturally follow in due course of time. It has come to be recognized that while so-called patent rights may be literally, though in a somewhat different sense, patent rights, there may be also patent wrongs, and it is these latter with which professional men are really in antagonism.

It is doubtless equally true that where a patent right is literally and genuinely a right, no reasonable or equitable man would take exception to it. It is clearly then a matter for discrimination between the right and wrong of the patent question, for that both these factors are elements of the problem has had ample demonstration.

It is not our purpose here to discuss the question of the limitations which should properly hedge about the professional aspect of patent rights, nor the ethical bearing of the problem, but to direct attention to two prominent methods which have been advanced for the protection of the dental profession against what are universally regarded by them as patent wrongs.

The Dental Protective Association of the United States, organized and promoted by Dr. Crouse, has attempted to relieve the dental profession from the injustice of patent wrongs by process of litigation in the courts, with the object of proving the illegality of certain patents, and, by annulling them, establishing precedents which would tend to prevent the active enforcement of similar patent claims.

That the Protective Association has accomplished much good by the application and development of its method of resistance is clearly evident. As a working method for combating the evil, the question of its efficiency is a matter in which every dentist has an interest, and has also the right to consider. It must be evident that as long as existing laws make possible the issuance of patents which work hardship and injustice to those whom, by the fundamental principles of patent legislation, they were intended to benefit, just so long will it be necessary to maintain some form of resistance to the oppressive operation of that class of patents. Inasmuch as individual resistance is practically impossible, viewed from the standpoint of the financial considerations involved, organized resistance becomes a necessity, and it is successful in proportion to its extent and capitalization, and the efficiency with which its potentiality is brought into defensive use.

But it is further to be considered that the perpetuation of such a defensive organization will be a necessity so long as the possibility of the issuance of the obnoxious class of patents under consideration continues. We are, under present circumstances, apparently in a position analogous to the resident of a house supplied with contaminated water, *i.e.*, constantly liable to infection. Our method of treatment may be highly efficacious, but it is nevertheless a method of therapeusis, not prophylaxis, and while the patient may thus be temporarily cured of a single attack of the patent disorder, he has by no means gained thereby immunity from subsequent outbreaks of it.

If our analogy be correct, the eradication of the difficulty should proceed upon prophylactic rather than upon therapeutic lines, or at least both should co-operate to the same end.

The suggestion of the Correspondent of the New York State Society is one which strikes at the source of the evil, and strikes vitally. There should be no misunderstanding of the principle at stake, or of the method now in operation for attaining the desired end. The whole matter has been elaborated and clearly set forth in several able editorials in the *Items of Interest*, notably in the issues for March, 1897, January, 1898, and March, 1898. These portray the whole situation, which, it would seem, is one to which every right-minded dental practitioner could lend his active support. It is inexplicable why the proposed amendment should incur the disapproval of the president of the Dental Protective Association, unless perhaps he fails to realize that the end to be attained is that for which, in the understanding of the members of that body, it was originally created.

Whatever may be the outcome, the movement is one which should enlist the effort and co-operation of the whole dental profession of America, even though ultimate failure to secure the legislation asked for should result. But we are informed that the matter is now in a most promising state of progress toward a successful issue. The committee of the New York State Society has presented its case to the United States Senate Committee, and, backed by the petition signed by 2600 dentists, has been favorably received.

The work is in competent hands, and we bespeak for the committee, of which Dr. Ottolengui is chairman, hearty support and furtherance in this important work.

## THE NEW DENTAL LAW OF NEW JERSEY.

New Jersey has labored and brought forth a law regulating the practice of dentistry in that state. We publish the full text of the document elsewhere in this issue. Hints of a forthcoming enactment embodying the riper views of the dental legislators of New Jersey have foreshadowed the event for some time past, and it has been awaited with expectant interest. The result is now before us, and is launched upon the tide of professional progress for good or ill.

It is to be presumed that where an old law is evicted by a new one, the animus of the change is a desire for improvement; hence it was a reasonable expectation that the new law of New Jersey should be the embodiment of changes which would promote in a higher degree the progress of dentistry in that state, and further conserve the interests of its citizens in so far as they are related to dental practice. It needs no argument to prove that dental laws are enacted, in fact are only possible of enactment, under normal conditions of legislative righteousness, in the interests of the people who constitute the community affected. No other conception of the status of this class of legislation is admissible under our Constitution. Where dental laws have been enacted for the sole benefit of dentists, the involved element of class legislation has more or less speedily worked their abrogation.

Does the new dental law of New Jersey eliminate the element of class legislation, and is it an improvement upon the previous law, measured by the standard of equity as related to the citizens of New Jersey and the dental profession of that state and elsewhere?

As a legal document the act is loosely drawn and is full of strained attempts to compass certain specific ends with doubtful success; but it is in its fundamental conception where its errors are vital in character and which make the enactment as a whole a travesty of dental law-making.

The groundwork of the new law is much the same as that of the old one, with the exception of certain additions and emendations. It may be of interest to examine some of these.

The law of 1890, Section 2, after prescribing the method of organization of the Board of Examiners and certain of its duties, says, "And its proceedings shall at all reasonable times be open to public inspection." This wise and wholesome provision is omitted from the present law. The same section also provides, with respect to the examination of applicants for license, that the said examination "shall in all cases be reasonable and fair." This provision is conspicuous by its absence from the new law.

The clause permitting the licensing of non-graduates is still retained, so that a candidate who "shall present the written recommendation of at least five licensed dentists of this state [New Jersey] of five years' standing, certifying that he is qualified for such examination," is legally eligible for the licentiate examination, and there is nothing in the law to prohibit the members of the Board of Examiners themselves from certifying to the qualifications of such non-graduate applicant.

The dental law is enacted on the assumption that it is a measure for the general good of the community, which it accomplishes by protecting the public against the ministrations of incompetent practitioners, and still further as a wholesome corrective of the tendency upon the part of colleges to graduate incompetent men.

What is there contained in the New Jersey law to show that it will function as a protection against the evils named? So far as its internal evidence is concerned, we are unable to discover a single provision guaranteeing the protection of any of the parties in interest excepting that of the Board of Examiners. No specifications as to the extent or character of the licensing examination are made. The whole power to arrange, conduct, and grade the examination is vested absolutely and unconditionally in the Board. It is now not even necessary, as it was formerly, that the examination shall be "reasonable and fair," nor is it any longer necessary that the proceedings of the Board "shall at all reasonable times be open to public inspection."

This kind of dental legislation savors of antiquity, if not of something worse. Verily "it hath an ancient and a fish-like smell." For a number of years Pennsylvania was saddled with a law conceived upon analogous autocratic lines; in fact, the family resemblance of the two is so striking that they might easily be suspected of having a common paternity. In the DENTAL COSMOS for July, 1894, we discussed at some length the atrocious and inequitable character of this kind of legislation; Pennsylvania practitioners gradually came to understand that a legalized autocracy in the form of a board of dental examiners was no more tolerable or worthy of support than a legalized autocracy in the form of a dental college faculty; that of two evils perhaps the latter was more worthy of professional confidence, and as a result there was enacted a law by which the public and the dental profession were made the final arbiters as to the qualifications of candidates for dental license, and the Board of Dental Examiners became the executives through whom justice was administered as between the dental candidate and the public. Not justice behind closed doors and by grace of the board, but with free opportunities for public inspection and under carefully specified conditions. If there is anything in the New Jersey law to prevent the Board of Examiners from doing exactly as they please without let or hindrance, and without accountability to any one, we fail to discover it. The title of the act does not fully define its function. It should read, "An Act to enable the Board of Dental Examiners to Regulate the Practice of Dentistry in the State of New Jersey," etc.

We were led to expect that the licensing of non-graduates in New Jersey would be abolished, and, further, that a reciprocity clause would be introduced. In the DENTAL COSMOS for December, 1895, p. 1063, the secretary of the New Jersey Dental Commission publishes a communication relative to certain defects of the former law which, in the light of the new enactment, make interesting reading. Among other things, two defects in the previous law were the subject of action by the New Jersey Examining Board, and the sentiments of its members were expressed in the following preamble and resolutions:

> "Inasmuch as what is now known as the student's clause of the dental law of 1890 (Sections 5 and 6) has proved to be the cause of much illegal practice and inefficient work, and consequently of great danger to the public and detriment to the profession; be it
>
> "*Resolved,* That the attention of the governor and legislature of the state be called to the matter, with the suggestion that the clauses allowing students to practice in preceptors' offices, and entitling them to an examination after five years' study, be stricken from the law.
>
> "*And be it further Resolved,* That we suggest that the law be so amended that graduates who have complied with the laws of other states having enactments similar to our own, and whose examinations are of an equal standing with the New Jersey Board's, be licensed to practice in this state without an examination, at the discretion of the board.
>
> "*Resolved,* That a copy of the above resolutions be forwarded to the Legislative Committee of the New Jersey State Dental Society."

As to the student clause, the communication quoted states, "It has been found almost impossible for a student to gain a requisite standard of the advanced education now required in the dental profession without attending college. So that this section of the law has proved to be a failure, viewed from every standpoint."

What has been the outcome? Evidently the Legislative Committee have for some cause, not at present apparent, failed in carrying out the wishes of the Board of Examiners. The student clause still stands in the new law, with such modifications as will ultimately and in the near future destroy its operation by limitation of time; but there still stands the other clause permitting the examination of a non-graduate upon recommendation of five practicing dentists, and the matter, therefore, so far as appearances go, is simply a case of tweedledum and tweedledee.

As to the other recommendation, the reciprocity clause in the matter of interstate recognition of licensees, the Board may issue its license to the licensee of any other state upon satisfactory proof that the applicant has been already legally licensed after examination in full compliance with its dental law, and after five years' practice, and after paying to the New Jersey Board fifty dollars, provided his professional education shall not be less than that required in New Jersey. That is to say, the Board may do as it pleases with regard to the acceptance of licensees of other states in all matters pertaining to the transaction, with the exception of the fifty dollars fee.

Would it not have been more conducive to the promotion of professional progress in New Jersey to have made the standard of examination a fixed quantity, and left the matter of the fee for adjustment in accordance with the pecuniary condition of the applicant at the discretion of the Board?

This attempt at reciprocity is unique of its kind. The benefits of the clause are to be conferred only upon such as have a professional education not less than that required in New Jersey. But what is the standard of professional education required in New Jersey? The law does not specify. That is a matter for the Board to determine. Therefore, the clause is really intended to be applicable only to those whom the Board may consider fit, and in this, as in all other respects, the Board is the final authority. It is true the Governor *may* remove a member for proven charges of incompetency, unprofessional conduct, etc., but even that is optional, and the law surrounds the Board with such other safeguards as render that provision practically a nullity.

What would the dental profession of New Jersey think of a dental college faculty fortified behind such a legal enactment, responsible to no one, and empowered to do as they pleased? We hazard the opinion that they would immediately take steps to protect the confiding citizens of that state against such a monstrosity, especially if said faculty were empowered to, and, as a matter of fact, did, issue licenses to non-graduates to practice in that state in competition with those who had honestly won the right to practice after pursuing a legitimate college course. As it is, if the suspicion is to be avoided that the practice of dentistry is hereafter to be conducted in New Jersey upon the basis of a close corporation, and the dental profession of that state really mean to do what is evidently suggested in their law, but wholly avoided in effect, we would suggest the enactment of a law which shall have for its fundamental concept the idea that the applicant for dental license really has some rights which the profession is bound to respect, and provide the means by which the profession may have the assurance that those rights are respected.

## SADNESS OF "THE LANCET" RESULTING FROM CHLOROFORM FATALITIES.

WE are pleased to note from the following editorial in the *Lancet* that a recognition of the poisonous character of chloroform as a general anesthetic in dental operations has led that journal to view with sadness the long list of fatalities caused by that drug.

As repentance may be regarded as a symptom of approaching regeneration, we shall hope for an early recognition by our English *confrères* of the criminality of using so dangerous an anesthetic as chloroform has been demonstrated to be in dentistry, and its final banishment from dental practice:

"Another fatality while chloroform was being administered for a dental operation appears to indicate that the practice of using that anesthetic in minor surgery is still adhered to. The patient, a healthy man, aged twenty-five years, was given chloroform on Saturday, January 29, by Mr. Dubourg. Several teeth were removed; then, as consciousness appeared to be returning, more chloroform was given and other teeth were taken out. Toward the close of the operation and, as we gather from the report before us, after chloroform had again been given, dangerous symptoms appeared, and ultimately the man died, although artificial respiration was practiced and restoratives were applied. We are not told what posture the patient was in or the method of giving chloroform employed, but we may assume that the 'open method' was used. It is extremely sad that the list of deaths under chloroform should be so long. In many of the cases the operations performed are of such a trivial kind as to make it matter for wonder that nitrous oxid gas is not given in place of a more powerful and dangerous anesthetic."

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# DENTAL LEGISLATION.

## DENTAL LAW OF NEW JERSEY.

AN ACT *to regulate the practice of dentistry in the State of New Jersey, and to repeal certain acts now relating to the same.*

Be it enacted by the Senate and General Assembly of the State of New Jersey:

### LICENTIATES.

1. The following persons only shall be deemed licensed to practice dentistry in this state:

(*a*) Those who are now duly licensed and registered as dentists pursuant to law, and

(*b*) Those who may hereafter be duly licensed and registered as dentists pursuant to the provisions of this act.

### STATE BOARD OF REGISTRATION AND EXAMINATION IN DENTISTRY.

2. The members and officers of the State Board of Registration and Examination in Dentistry, as now constituted pursuant to chapter one hundred and forty-three of the laws of eighteen hundred and ninety, may continue to hold office until the expiration of their terms, unless previously removed; the New Jersey State Dental Society shall, at each of its annual meetings, recommend to the Governor for appointment as a member of said board a dentist of good repute, residing and practicing in this state, whom the Governor shall appoint; the member so appointed shall hold office for five years, or until his successor is appointed; the Governor shall also fill, for the unexpired term only, vacancies occurring in the board by reason of death, resignation, or otherwise; cause being shown before him, he may remove a member from office upon proven charges of inefficiency, incompetency, immorality, or professional misconduct; the board shall, at its annual meeting, elect from its members a president and secretary; it

shall hold at least two meetings annually for examining and licensing persons to practice dentistry in this state, at which meetings three members shall constitute a quorum; said board shall have the power to determine the good standing and repute of any dental school, college, or department of a university, and may from time to time designate in some public manner schools, colleges, or departments of universities whose diplomas will be received by it; it shall annually make a report of its proceedings to the Governor; the seal heretofore adopted by it shall continue to be the common seal of the board; it may sue or be sued, and in all actions brought by or against it, the board shall be designated as "The State Board of Registration and Examination in Dentistry."

### EXAMINATION.

3. The board shall from time to time adopt rules for its own government and for the examination of candidates for license to practice dentistry; any rule altering the nature or increasing the severity of the examination or the subjects to be included therein shall not be enforced within six months after its adoption and public promulgation; the examination of applicants shall be confined to written or oral, or both written and oral, examination upon subjects properly relating to the science of dentistry, the knowledge of which is necessary to the proper and skillful practice of said science; the board may also require from applicants, as part of the examination, demonstrations of their skill in operative and mechanical dentistry; no person shall be examined by the said board unless he be twenty-one years of age, of good moral character, and have received a preliminary education equal to that furnished by the common schools of this state and be graduated in course with a dental degree from a dental school, college, or department of a university recognized by said board, or shall present the written recommendation of at least five licensed dentists of this state of five years' standing, certifying that he is qualified for such examination, or shall hold a diploma or license conferring full right to practice dentistry in some foreign country and granted by some authority recognized by the board; any member of the board may inquire of any applicant for examination concerning his qualifications, and may take testimony of any one in regard thereto, under oath, which he is hereby empowered to administer.

### EXAMINATION FEES.

4. Every applicant for license to practice dentistry shall file his application with and pay to the secretary of said board a fee of twenty-five dollars and present himself for examination at the first regular meeting of the board after such application, due notice of which shall be given; such fee shall not be refunded, unless from sickness or other good cause appearing to the satisfaction of the board such applicant was prevented from attending and completing such examination; further or subsequent examinations under such application may be given to applicants in the discretion of the board without payment of additional fee.

### EXPENSES OF BOARD.

5. The board may cause to be paid out of the fees, fines, and penalties had and received by its secretary all proper expenses incurred by it under the provisions of this act, including mileage to each member at the rate of five cents per mile for all distances necessarily traveled in discharge of his duties, and an annual salary of one hundred dollars to its secretary; all moneys received shall be held by the secretary and paid out only upon resolution of the board and warrant of its president; the secretary shall give bond in such sum and with such surety as the board may from time to time direct and approve; a statement of all moneys received and disbursed by the board shall be annually submitted to the Governor in the annual report of said board, and the surplus, if any, after payments as aforesaid, shall be paid to the state treasurer.

### LICENSES.

6. Said board shall register as licensed dentists, and under its seal and the hand of its president and secretary, issue to all persons who shall successfully pass said examination, its license to practice dentistry in this state;

the board may also, without the examination hereinabove provided for, issue its license to any applicant therefor who shall furnish proof satisfactory to it that he has been duly licensed after examination to practice dentistry in any state after full compliance with the requirement of its dental laws, and has been lawfully and reputably engaged in said practice for five years next preceding his application; *provided, however*, that his professional education shall not be less than that required in this state; every license so given shall state upon its face the grounds upon which it is granted, and the applicant may be required to furnish his proof upon affidavit. The fee for such license shall be fifty dollars.

### Revocation of Licenses.

7. Upon presentation to the board of a certified copy of a court record, showing that a practitioner of dentistry has been convicted of felony or misdemeanor, that fact may be noted upon the record of licenses, and the license and registration shall be marked canceled; any person whose license shall be so canceled shall be deemed an unlicensed person, and, as such, subject to the penalties prescribed for other unlicensed persons who practice dentistry.

### Construction of this Act.

8. This act shall not be construed to prohibit an unlicensed person from performing mechanical work upon inert matter in a dental office or laboratory; or to prohibit the registered student of a licensed dentist from assisting his preceptor in dental operations while in his presence and under his direct and immediate personal supervision; or to prohibit a duly licensed physician from treating the diseases of the mouth or performing operations in oral surgery; nothing in the provisions of this act shall be construed to permit the performance of dental operations by any unlicensed person under cover of the name of a registered practitioner; any person now registered as a student may present himself for examination to the board upon complying with the provisions of this act relative to examination, and presenting to the board a certificate, under oath from the dentist or dentists with whom he has studied, that such applicant has studied as a student with the dentist or dentists so certifying for not less than five years continuously; *provided, however*, such applicant shall have filed on or before the first day of June, eighteen hundred and ninety-eight, a notice with the board that it is his purpose to avail himself of the exemption hereby made; the board may, however, at any time, upon proof of the violation of any of the provisions of this act by such student, revoke his right to present himself for and pass such examination; any person shall be regarded as practicing dentistry within the meaning of this act who shall use the words, "doctor of dental surgery," "doctor of dental medicine," or the letters "D.D.S." or "D.M.D." in connection with his or her name, or any other title intended to imply or designate him or her as a practitioner in dentistry in all of its branches, and who, in connection with such title or titles, or without the use of such titles, shall practice dentistry in any of its branches; and it is further provided that the use of any one of the aforementioned titles or the exposition of a sign, circular, advertisement, or any other device or information indicating thereby the occupation of the person or persons, shall be taken and considered in the trial of any indictment which may be found for the violation of any of the provisions of this act as prima facie evidence.

### Associations or Companies Practicing Dentistry.

9. That hereafter if any association or company of persons, whether incorporated or not, shall engage in the practice of dentistry under the name of "company," "association," or any other title, the said company or association shall cause to be displayed and kept in a conspicuous place at the entrance to its place of business the names of each and every person employed by said company or association in the practice of dentistry; and any person employed by such company or association whose names shall not be displayed as above provided, shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished as hereinafter provided; and the said association or company if incorporated, or the persons comprising the same if not incorporated, shall for such failure to display

the aforesaid names be guilty of a misdemeanor, and upon conviction thereof shall be punished as hereinafter provided.

### Annual Registration.

10. That hereafter there shall be an annual registration of every person, persons, company, or association practicing dentistry within the state, together with an annual registration of each and every assistant in the employ of every such person, persons, company or association; it shall be the duty of the secretary of this board not later than the first day of December in each year to prepare and mail to every person, company, or association known to be practicing dentistry within this state a document to be known as the "annual registration blank," upon which shall be proper space for the indorsement of the name, residence, and location of office, of the person, company, or association to whom the same is sent, together with the name and residence of every assistant employed in any such office; and it shall be the duty of every person, company, or association upon the receipt of said blank to fill in the name, residence, and location of office, of said person, company, or association, and also the name and residence of each and every assistant employed by said person, company, or association in any such office; said return shall be fully completed and returned to the secretary of this board within thirty days after its receipt; for failure to comply herewith the person, company, or association shall be liable to a fine of ten dollars besides costs, to be sued for in the name of the board, in any court of competent jurisdiction; said fine to be paid into the treasury of the board; and any person, company, or association making any false statement concerning or touching any matter or thing covered by this section shall for such offense be liable to a fine of fifty dollars besides costs for each and every offense, to be sued for in the name of said board in any court of competent jurisdiction; said fine to be paid into the treasury of said board.

### List of Practitioners and Assistants.

11. That hereafter it shall be the duty of every person, company, or association practicing dentistry within this state, upon demand in writing made by the secretary of this board, to furnish, within thirty days after said demand to the state board through its secretary, the name and address of each and every person practicing dentistry or assisting in the practice thereof, in the office of said person, company, or association, together with a statement showing under and by what license or authority the said person, company, or association is practicing; for failure so to do the said person, company, or association shall be liable to a fine of ten dollars, besides costs, to be sued for in the name of the board in any court of competent jurisdiction, said fine to be paid into the treasury thereof; and any person, company, or association making any false statement concerning or touching any matter or thing covered by this section shall for such offense be liable to a fine of fifty dollars, besides costs, for each and every offense, to be sued for in the name of said board in any court of competent jurisdiction, said fine to be paid into the treasury of said board.

### Penalties and Fines.

12. Any person, company, or association practicing or holding himself or itself out to the public as practicing dentistry, not being at the time of said practice or holding out legally licensed to practice as such in this state, shall be guilty of a misdemeanor and punishable upon conviction of a first offense by a fine of not less than fifty dollars, and upon conviction of a subsequent offense by a fine of not less than one hundred dollars, or by imprisonment of not less than two months, or by both fine and imprisonment.

13. Any person, company, or association, for failure to comply with each and every provision and condition contained in the ninth, tenth, and eleventh sections of this act shall be guilty of a misdemeanor, and upon conviction thereof shall be punished with a fine of not less than five hundred dollars, or by imprisonment of not less than six months, or by both fine and imprisonment.

14. Any person, company, or association shall be guilty of a misdemeanor, and upon every conviction thereof shall be punished with a fine of

not less than five hundred dollars, or by imprisonment for not less than six months, or by both fine and imprisonment, who

(1.) Shall sell or barter, or offer to sell or barter, any diploma or document conferring or purporting to confer any dental degree, or any certificate or transcript made or purporting to be made pursuant to the laws regulating the license and registration of dentists; or

(2.) Shall purchase or procure by barter any such diploma, certificate, or transcript with intent that the same shall be used as evidence of the holder's qualification to practice dentistry, or in fraud of the laws regulating such practice; or

(3.) Shall with fraudulent intent, alter in a material regard any such diploma, certificate, or transcript; or

(4.) Shall use or attempt to use any such diploma, certificate, or transcript which has been purchased, fraudulently issued, counterfeited, or materially altered, either as a license or color of license to practice dentistry, or in order to procure registration as a dentist; or

(5.) Shall practice dentistry under a false or assumed name; or

(6.) Not being now duly licensed and registered as a dentist, shall assume the degree of "doctor of dental surgery," or "doctor of dental medicine," or shall append the letters "D. D. S.," or "D. M. D." to his or her name, not having had duly conferred upon him or her by diploma from some college or school legally empowered to confer the same the right to assume said titles; or shall assume any title or append any letters to his or her name with the intent to represent falsely that he has received a dental degree or license; or

(7.) Any person who, in any affidavit or examination required of an applicant for examination, license, or registration under the laws regulating the practice of dentistry, shall make wilfully a false statement in a material regard, shall be guilty of a high misdemeanor, punishable upon conviction thereof by a fine not exceeding five hundred dollars, or by imprisonment at hard labor not exceeding five years, or both, at the discretion of the court.

15. All fines, penalties, or forfeitures imposed or collected for the violation of any of the foregoing provisions of this act, shall be paid as follows: one-half thereof to the county collector of the county in which the prosecution is had, and one-half thereof to the secretary of this board, to be held, disposed, and accounted for by him as hereinabove directed; and it shall be the duty of the county collector of each county, upon receipt by him of any such fine, penalty, or forfeiture, to forthwith pay over to the secretary of this board one-half of the same; said board or any member or officer thereof may prefer a complaint for violation of the law regulating the practice of dentistry before any court, tribunal, or magistrate having jurisdiction, and may by its officers, counsel, and agents aid in presenting the law or facts before said court, tribunal, or magistrate in any proceeding taken thereon; and it shall be the duty of the prosecutor of the pleas of the counties of this state to prosecute all violations of the aforesaid provisions of this act.

### Additional Fines and Penalties in Civil Proceedings.

16. In addition to all of the fines, forfeitures, and penalties hereinabove provided for, it shall be lawful for the said board to institute civil proceedings in any court of competent jurisdiction against any person, company, or association for the violation of any of the provisions of this act; such proceeding shall be brought in an action in debt, and, upon conviction thereunder, the person, company, or association so convicted shall be liable to a fine, which shall be the same amount fixed in the section of this act, for violation of which the suit shall have been brought; and all fines and penalties collected by any court under the provisions of this section of this act shall be paid over to the secretary of this board, to be received and disbursed by him in accordance with the provisions of this act.

17. The following laws are hereby repealed, to wit: chapter two hundred and sixty of the laws of eighteen hundred and seventy-three; chapter twenty of the laws of eighteen hundred and eighty-four; chapter one hundred and forty-three of the laws of eighteen hundred and ninety, and chapter forty-four of the laws of eighteen hundred and ninety-four.

18. This act shall take effect immediately.

(Approved March 17, 1898.)

# HINTS, QUERIES, AND COMMENTS.

A Somewhat Novel, but Most Effectual, Method of Filling Teeth.—The subject of filling the natural teeth with the numerous materials used for the purpose has been ventilated by the pens of more dental writers than perhaps all other subjects combined, with the exception of "pyorrhea," which wields the scepter with a commanding hand, waving all others into a back seat. The most plausible reason to me for this unabating agitation of the subject is that there is a lack of therapeutic and mechanical harmony in the materials as applied to the conditions, and, as a result, the preserving of the natural teeth in the hands of the rank and file has been most unsatisfactory. Some of the materials and methods are, in the hands of the few, thoroughly adequate; but none in the hands of the many. We all agree that there are objectionable features to every material used for filling teeth. Gold, of course, is superior to all others, but, even with it, an absolutely moisture-tight filling can be made in the hands of the most skillful only. Cements are the best tooth preservers, *per se*, but the fact that a filling of this material wears and dissolves at its outer surface has stamped it with inadequacy. Alloys, when crystallized, are the hardest of all filling-materials, but their inevitable shrinking properties and lack of "edge-strength," under ordinary circumstances, remove them far from the ideal. Gutta-percha is too soft; tin foil, oxidizable and crumbling. All of these, and others, have their desirable qualities, but none are free from unreliability, as commonly used.

There is little diversity of opinion as to the cause of failure in the use of all materials, save gold, which is responsible for a world of dispute in the realm of dentistry, as well as in politics.

One writer lays forcible stress upon his pet theory of the cause of the failure of a gold filling, and he calls it imperfect adaptation. He has a level head. Another, that it is a lack of therapeutic conditions, and advocates the combining of gold with other materials, as alloys, tin, etc. Others attribute the failure to the mallet, with its sudden impact, producing fracture of the enamel at the cervical border, with subsequent imbibition and fermentation, producing decay. Others, the imperfect and unscientific preparation of the cavity; and still others who insist that it is the imperfect contour and finish of the filling, affording lodgment for food. All these, and many more, have been given as causes responsible for failure, leaving the great majority of the profession less fixed in their convictions and adrift.

It is not my aim, in writing this article, to advocate a method of filling the teeth that can be made successful in the hands of the most skillful only, but a method producing good results in the hands of every dentist who employs it or who will employ it. We will not discuss the therapeutic treatment preparatory to filling the teeth, but, assuming that to have been done, will deal only with the operation from a mechanical standpoint.

The "filling," whether it be new or old, to which I desire to invite your attention with an unusual degree of advocacy and emphasis is inserted in the following manner: First apply the rubber-dam, and carefully cleanse and form the cavity, which is always essential, irrespective of the material used. This having been done, all the instruments and gold necessary in the placing of an ordinary gold filling are put at the operator's most convenient disposal. Allow nothing to occur or omit no preparation that will delay the operation of filling when once begun. Now mix to about the consistence of very thick cream, or a little thicker than for the cementing of a gold crown, a good quality of slow-setting cement (preferably Justi's), in quantity sufficiently large to almost fill the cavity, and while it is yet semi-liquid pack comparatively large pellets of gold into the cavity with graceful rapidity, displacing as much of the cement as is possible, filling the cavity with gold very much as if it had not previously been occupied by the cement, using first hand-pressure, then the mallet, being careful to force the gold into contact with the margins of the cavity. When about two-thirds of the cavity is thus filled with gold, the exposed or remaining margins of the unfilled portion of the cavity are cleansed of any remaining cement, which would at this stage of the operation be in a state of advanced crystallization; the filling is then built up and completed in the ordinary way. No cement should be exposed at any marginal point of the cavity, but if such should be the case there is no occasion for alarm.

The benefits and advantages derived from this sort of fillings are legion. The method compensates for that much-talked-of lack of adaptation, which is always the most prominent cause of failure. It binds the filling and walls of the cavity together, thus giving additional strength and support to both; it is easier and more quickly finished; it gives better anchorage to the filling, and necessitates less undercutting, giving much less pain to the patient in the preparation of the cavity. Such a filling can be placed with much more comfort to the operator and in infinitely less time. Other advantages exist, but are of less importance, hence I will not dwell upon them.

The same method applies most admirably to amalgam fillings. As with the gold filling described, the amalgam should constitute the body of the filling, and the cement the lining of the cavity. The semi-liquid cement, when placed in the cavity of a tooth, performs its first function of usefulness by aiding very materially in the holding of the amalgam at the mouth of the cavity preparatory to pressing it home, obviating the necessity of holding it in position by other means less convenient.

The amalgam is forced through the center of the cement, which (cement) exudes at the periphery of the cavity, and which should be brushed away before inserting a second piece, and the brushing-away process continued after the insertion of each piece until the cavity is filled.

It matters little, with this sort of filling, what kind of amalgam is used, or whether its tendency to shrink is much or little; for as a theory that practical tests have demonstrated I hold that the adhesive property of the cement, or its adhesive attachment, both to the amalgam and to the walls of the cavity, exerts such a tenacious influence over the crystallization of the amalgam that it prevents the slightest contraction or shrinking. Where there is no shrinking of an amalgam filling, there is absolutely no "edge-breakage" possible. Much is said about the "edge-strength" of amalgam; but it occurs to me that the cause of a large proportion, if not all, of the "edge-breakage" so much talked about is due to the shrinking of the amalgam filling and a consequent separation between the frail edge and the margin of the cavity,—microscopical in extent, perhaps, yet a separation which takes away from the frail edge its only support. If a condition of affairs can be produced which will prevent this minute separation, and the edge of the filling be held in adhesive contact with the margin of the cavity, there will be little or no danger of "edge-breakage." Such a condition can be produced by the use of the method I have described.

In addition to the foregoing important advantages, this sort of amalgam filling possesses most of the advantages claimed for the gold filling described. It is needless, perhaps, to add that absolute dryness and also neatness and cleanliness of manipulation, incorporating as little of the cement with the gold or amalgam as possible, is of the most vital importance. The method above described is new, so far as I know, with reference to gold, but has previously been advocated with reference to amalgam; Dr. James M. Magee, St. John, N. B., having written an article for the September, 1897, number of *Items of Interest*, in which he advocates, in connection, the use of the matrix, but does not give a satisfactory reason for doing so.

The matrix cannot be used to advantage in such a case, as it would defeat the very object sought, which is to produce a filling with a cement lining that is unexposed. The matrix would prevent the free exuding and displacement of the cement, which would necessarily result in partial exposure of the cement at the surface of the finished filling.

The most skillful operator will, of course, get the most perfect results from this method, but my object in writing the article is to advocate a method from which every practicing dentist may expect successes to which he has been hitherto unaccustomed.—H. S. LOWRY, D.D.S., Kansas City, Mo.

A NICE WAY OF REPAIRING RICHMOND CROWNS.—Since broken facings seem to be the bugbear in the stability of crown- and bridge-work as it is practiced to-day, it has occurred to me that the following would be found quite new and interesting to the profession:

Where it is necessary to put on a new facing, grasp the crown at the extreme lower end of the ferrule with a suitable pair of pliers (I use the large cone-socket pliers with serrated beaks); it will come away readily, without in the least disturbing the root. Any person who has had a fair amount of experience in extracting teeth knows that it requires a certain knack as well as a considerable amount of force to remove a cuspid or even a central root. Now, while it also requires a certain knack, it nevertheless needs but little exertion to rotate and release the crown from the root, no matter how well the operator may have fitted and cemented the band.

Replace the crown on the root and take a plaster impression. Take the crown off the model, place in a vise, and with a file dress down the backing; drill holes for pins and ream them out on both sides for solder. Grind the facing and burnish thin platinum to the tooth and solder, without, of course, bending the pins.

This method will be found to work equally well in repairing large bridges. While it may seem doubtful to those who have never tried it, if they will but give it a trial they will be convinced of its practicability.—RUDOLPH ERLER, Rochester, N. Y.

HOW TO REMOVE A PIN CEMENTED TO A ROOT, OR TO A PIVOT CROWN.—I asked this question of a professional friend recently, and he replied, "Extract the root and split it open." I thought this a little too heroic practice, and suggested a milder one. I had a practical case in hand, a patient who had broken a cemented pin at the junction of a common pivot crown with an upper right lateral root.

It occurred to me that a strong alkali ought to dissolve the phosphoric acid of the cement, and thus cause the disintegration of the filling. So I went home and threw the pivot crown, in which was a part of the metallic pin, into a bottle of strong aqua ammonia and let it remain over night. Upon removing it I found the cement a complete mush, and easily removed along with the pin also. My patient called soon after, when with a small abscess tubular knife in the engine hand-piece I cut the cement around the pin as far up as was expedient, and then with a fine-pointed hatchet excavator proceeded to finish the operation, applying the aqua ammonia to decompose the remaining cement, and protecting the gum underneath with a piece of rubber-dam covered with a napkin, stopping occasionally to rinse the mouth with warm water. After ten or fifteen minutes' manipulation my efforts were rewarded by a slight movement of the pin, when I seized the end of it with a small pair of pliers and with a rotary motion removed it.

I believe that oxyphosphate fillings last longer in mouths where there is an acid reaction of the saliva, and are less permanent where an alkaline condition prevails. This afforded me the hint, and the result was not unexpected.—WILLIAM B. MEAD, Providence, R. I.

CINNAMON OIL IN ANTERIOR TEETH.—In this age of dentistry we are compelled by public opinion to do something more than cure an alveolar abscess. We must leave the pulpless tooth, after filling, as near the original color as possible; therefore cinnamon oil is contraindicated for the treatment of anterior teeth.

Cinnamon bark contains tannic acid and a yellowish volatile oil. The oil consists essentially of cinnamic aldehyde, or the hydride of cinnamyl, and by the absorption of oxygen, as it becomes older, it darkens in color and develops a resinous compound with cinnamic acid. Thus a devitalized tooth, having been treated with a dressing of oil of cinnamon, takes on that dark grayish color which it is impossible to remove by any known bleaching agent.

We often see iodoform and oil of cinnamon paste recommended as a pulp-canal dressing, or even as a filling for the canal. Iodoform alone is liable to discolor the tooth, but in conjunction with cinnamon oil, the most penetrating of the essential oils, one may surely expect discoloration to follow. The discoloration will probably not occur immediately, but some time after, when we think the color is fixed, the patient will return and show you how unsightly the tooth is becoming.

If iodoform is really indicated in an anterior tooth, it would be much better to use it in conjunction with the oil of eucalyptus, or carbolic acid. But even that would not be correct practice when we have so many other good antiseptics and disinfectants, which answer the purpose as well, and which are not liable to the objection here under consideration. When the operator is confronted by a devitalized tooth that will not bleach satisfactorily, and ordinary care has been used as to other discoloring agents, he will more than likely learn, from either the history of the case or his own record of the previous treatment, that the oil of cinnamon has been used as a canal-dressing.

Every dentist knows and doubtless appreciates the wonderful properties of the oil, but we must differentiate as to the places in which it should be used.—HARRY B. HICKMAN, D.D.S., Philadelphia.

# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

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The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

**Ajello**. Du morcellement des amygdales. Presse méd. belge, Brux., 1898, l, 36.—**Albert** (E.) Sur une variété de stomatite épidémique; relation de trois épidémics. Arch. de méd. et pharm. mil., Par., 1898, xxxi, 89–117.—**Albert** (H. L.) The sulpho-cyanide of potassium in saliva. Lancet, Lond., 1898, i, 494–496.—**Albertin**. Cancer récidivé de la lèvre inférieure avec propagation au maxillaire; resection en bloc de la tumeur (parties molles et les ⅔ de la portion horizontale du maxillaire); prothèses immédiates et successives; autoplasties; restauration de la region; rétablissement de la fonction; guerison sans récidive controlée 4 ans après l'intervention. Province méd., Lyon, 1898, xii, 76.—**Ambler** (H. L.) Tin foil. Items Interest, N. Y., 1898, xx, 183.—**Anacker**. Trichosis auf der Zunge der Rinder. Thierarzt. Wetzler, 1898, xxxvii, 25–27.—**Andrews** (R. R.) Chairman's address [on stomatology]. J. Am. M. Ass., Chicago, 1898, xxx, 633–636.—**d'Argent** (J.) De l'instabilité des anesthésiques réfrigerants. Odontologie, Par., 1897, 2. s., iv, 453–458.—**Astié** (H.) De l'acetylène en photomicrographie. Rev. odont., Par., 1898, xvii, 18–20.—**Atkinson** (D. D.) Dentistry in the twenties. Am. Dent. Weekly, Atlanta, 1898, i. 317–320.—**Audry** (C.) **et Iversenc.** Sur une gomme syphilitique primitive et isolée d'une amygdale. Arch. méd. de Toulouse, 1898, iv, 38–40.—**Avoledo** (P.) Il serramento delle mascellein seguito a lesioni suppurative dell' orecchio. Arch. ital. di otol. [etc.], Torino, 1898, vii, 65–70.—**Bagozzi** (G.) Di un caso d'infezione secondaria ad avulsione dentale di eccezionale gravità. Boll. clin.-scient. d. Poliambul. di Milano, 1897, x, 133–136.—**Baldwin** (K. W.) Peritonsillitis; its etiology and treatment, J. Am. M. Ass., Chicago, 1898, xxx, 595.—**Baumgarten**. Geschwüre des harten Gaumens. Pest. med.-chir. Presse, Budapest, 1898, xxxiv, 209.—**Beadles** (C. F.) A case of early tubercle of tongue. Tr. Path. Soc. Lond., 1896–7, xlviii, 61. ——— Myxomatous tumour of submaxillary gland. *Ibid:* 66. —**Berdach** (J.) Beitrag zur Anwendung concentrirter Cocainlösungen. Wien. klin. Wchnschr., 1898, xi, 178.—**Berger** (F.) L'empyème de l'antre d'Highmore. Rev. internat. de rhinol., otol. et laryngol., Par., 1898, viii, 1–25.—**Bernheim** (J.) Ueber einen bakteriologischen Befund bei Stomatitis ulcerosa. Centralbl. f. bacteriol. [etc.], 1 abt. Jena, 1898, xxiii, 177–182.—**Biondi** (D.) Contributo alla plastica endorale. Riforma med., Napoli, 1898. xiv, pt. 1, 99; 111.—**Black** (G. V.) Instrument nomenclature with reference to instrumentation. Indiana Dent. J., Indianap., 1898, i, 198–228. ——— *Also:* Ohio Dent. J., Toledo, 1898, xviii, 139–145.—**Black** (S. P.) Actinomycosis. South. Calif. Pract., Los Angeles, 1898, xiii, 41–44.—**Bliss** (A. A.) Certain conditions of the tonsils which limit the usefulness of the tonsillotome. J. Am. M. Ass., Chicago, 1898, xxx, 591–593.—**Boniquet** (J.) Un cas d'angine de Ludwig causée par la carie d'une dent de sagesse. Odontologie, Par., 1897. 2. s., iv, 464–467.—**Brackett** (C. A.) The dentists' eyesight. Items Interest, N. Y., 1898, xx, 184–187.—**Bresee** (P. H.) A prothetic reconstruction. South. Calif. Pract., Los Angeles, 1898, xiii, 44–46.—**Brosius** (F. A.) Pulp mummification *versus* science? Am. Dent. Weekly, Atlanta, 1898, i, 305.—**Brown** (F. N.) Case of electroplating. Dental Digest, Chicago, 1898, iv, 84–86.—**Brown** (G. V. I.) A five-minute study of pyorrhea alveolaris. Items Interest, N. Y., 1898, xx, 176–180.—**Bucalossi** (A.) Ascesso della parotide sinistro da strettococco piogene e nefrite acuta concomitante. Settimana med. d. Sperimentale, Firenze, 1897, li, 595–598.—**Buckley** (F. S.) Incidents from practice in Germany. Dental Rev., Chicago, 1898, xii, 175–183. —**Bull** (C. S.) The connection between diseases of the eye and diseases of the teeth. Internat. Dent. J., Phila., 1898, xix, 137–152.—**Burchard** (H. H.) Syphilitic affections of the mouth. *Ibid:* 162–167. ——— Varieties of dental calculi. Dental Cosmos, Phila., 1898, xl, 1–9.—**Butlin** (H. T.) What operation can do for cancer of the tongue. Med. Press & Circ., Lond., 1898, n. s., lxv, 243–245.—**Calvert** (J.) A tooth-plate impacted for eight months in the oesophagus, and causing death by ulcerating into thoracic aorta. Tr. Path. Soc. Lond., 1896–7, xlviii, 71.—**Carter** (T. S.) Fracture of the inferior maxilla treated by a modified method of wire suture. Lancet, Lond., 1898, i, 571.—**Case** of hypertrophy of the gums. Brit. J. Dent. Sc., Lond., 1898, xli, 106.—**Casselberry** (W. E.) **and F. Menge.** Tonsil and adenoid operations under anesthesia by nitrous oxid, and nitrous oxid and oxygen; a preliminary report. J. Am. M. Ass., Chicago, 1898, xxx, 547–551.—**Castex** (A.) De la brièveté palatine. Gaz. méd. de Par., 1898, 11. s, i, 26–28.—**Chittenden** (R. H.) Variations in the amylolytic power of saliva and their relation to the chemical composition of the secretion. Proc. Am. Physiol. Soc., Bost., 1898, pp. iii–v.—**Choquet** (J.) Quelques considerations sur le leptothrix buccales. Odontologie, Par., 1898, 2. s., v, 10–15.—**Chupein** (T. F.) Construction of crown and bridge work. Dental Office & Lab., Phila., 1898, xii, 33–38.—**Claisse** (P.) Hydroparotide intermittente. Bull. et mém. Soc. méd. d. hôp. de Par., 1898, 3. s., xv, 140–143.—**Clapp** (D. M.) X-rays. Internat. Dent. J., Phila., 1898, xix, 86, 1 pl.—**Clayton** (J. B.) Non-cohesive gold, tin, and tin-gold. Indiana Dent. J., Indianap., 1898, i, 193–197.—**Clutton** (H. H.) Case of pharyngeal abscess; hæmorrhage; ligature of carotid arteries. Med.-Chir. Tr., Lond., 1897, lxxx, 383–388.—**Colter** (J. H.) Practical vs. theoretical tonsillotomy. J. Am. M. Ass., Chicago, 1898, xxx, 476–479.—**Coolidge** (A.) *jr.* Hysterical dysphagia. Tr. Am. Laryngol. Ass., 1897, New York, 1898, 24–36.—**Coon** (W. W.) Gold in amalgam. Dental Cosmos, Phila., 1898, xl, 17.—**Coulliaux** (L.) Anatomia, fisiologia, patologia della polpa dentale (uomo). Gior. di corrisp. p. dentisti, Milano, 1897, xxvi, 295–324.—**Crile** (G. W.) A new method of applying cocaine for producing surgical anaesthesia, with the report of a case. Tr. Ohio M. Soc., Norwalk, 1897, 90–93.—**Curtis** (G. L.) Resection and reproduction of the maxillæ. J. Am. M. Ass., Chicago, 1898, xxx, 646–649. ——— Volasem, an antidote to cocaine. Items Interest, N. Y., 1898, xx, 180.—**Davenport** (J. L.) Esthetic prosthetic dentistry. *Ibid:* 165–167.—**Deekens** (W. F.) Nonoxygenation of the blood by nitrous oxide gas. *Ibid:* 172.—**Delavan** (D. B.) Tertiary ulceration simulating sarcoma of the tonsil. Tr. Am. Laryngol. Ass., 1897, New York, 1898, 116–119. [Discussion], 122–125.—**De Renzi.** Sulla diagnosi e cura delle malattie respiratorie. Boll. d. clin., Milano, 1897, xiv, 481–512.—**Dodge** (H. N.) Reciprocating tooth-movement: a sequel. Dental Cosmos, Phila., 1898, xl, 196–198.—**Dorez** (L.) L'émail fusible en art dentaire; son histoire. Odontologie, Par., 1898, xviii, 54–62. [Discussion], 73.—**Dow** (T. D.) The evolution of the modern denture. Dental J., Ann Arbor, 1898, vii, 54–56.—**Ducournau.** Des dents temporaires et des dents de six ans; consequences fâcheuses du manque de soins; leur traitement. Rev. odont., Par., 1898, xvii, 6–14.—**Ducrey** (A.) **et E. Respighi.** Les localisation sur la muqueuse buccale de l'affection improprement appelée porokératose. Ann. de dermat. et syph., Par., 1898, 3. s., ix, 1–5. ——— *Also, transl.:* Gior. internaz. d. sc. med., Napoli, 1898, n. s., xx, 20–23. ——— *Also, transl.:* Policlin., Roma, 1898, v, sez. med., 15–17. ——— *Also, transl.:* Riforma méd., Napoli, 1898, xiv, pt. 1, 3–5. ——— *Also:* Clin. mod., Pisa, 1898, iv, 14.—**Ellegood** (J. A.) The treatment of chronic inflammation of the tonsils. J. Am. M. Ass., Chicago, 1898, xxx, 593.—**Eröss** (J.) Ueber Tonsillitis follicularis der Neugeborenen. Ungar-med. Presse, Budapest, 1898, iii, 181–183.—**Falcone** (C.) Contributo alla istogenesi ed alla struttura delle glandole salivari. Monitore zool. ital., Firenze, 1898, ix, 11–27, 1 pl.—**Faraci** (G.) Cura chirurgica della faringite cronica iperplastica. Arch. ital di otol. [etc.], Torino, 1898, vii, 71–76.—**Faries** (R.) A new operation for uraniscoplasty. Ann. Surg., Phila., 1898, xxvii, 374.—**Fillebrown** (T.) Report of an operation for cleft palate. J. Med. & Sc., Portland, 1897–8, iv, 127.—**Fogg** (J. M.) La cataforesi applicata alla cura delle periostiti. Gior. di corrisp. p. dentisti, Milano, 1897, xxvi, 345–347.—**Frassi** (A.) Di alcuni anestetici locali (cocaina, eucaina, olocaina). Clin. mod., Pisa, 1898, iv, 29–31.—**Freeman** (A. B.) The need of local coöperative dental protection. Dental Rev., Chicago, 1898, xii, 183–187.—**French** (E. C.) Live pulp and gutta-percha in same pulp-canal. Dental Digest, Chicago, 1898, iv, 81.—**Freudenthal** (W.) Salivary calculi. J. Am. M. Ass., Chicago, 1898, xxx, 469–471.—**Frey.** De l'hémostase en chirurgie dentaire par la gélatine. Odontologie, Par., 1897, 2. s., iv, 458–461.—**Gavello** (G.) Polipi mucosi dell' antro mascellare sinistro. Arch. ital. di otol. [etc.], Torino, 1898, vii, 82.—**Gevaert.** Tumeur de la langue chez un enfant de trois mois. Ann. Soc. belge de chir., Brux., 1897–8, v, 252.—**Gibb** (J. S.) General and local anesthesia in laryngology and rhinology. J. Am. M. Ass., Chicago, 1898, xxx, 543–547.—**Gilbert** (V. W.) A dental anomaly. Dental Cosmos, Phila., 1898, xl, 35.—**Gilmour** (W. H.) Debatable points in anæsthetics. Dental Rec., Lond., 1898, xviii, 55–63.—**Gleitsmann** (J. W.) Remarks on treatment of chronic affections of the faucial tonsils, with demonstration of instruments. Tr. Am. Laryngol. Ass., 1897, New York, 1898, 36–47.—**Goble** (L. S.) Painless dentistry. Dental Cosmos, Phila., 1898, xl, 14–17.—**Gradenigo** (G.) Sulla iperplasia della tonsilla faringea (vegetazioni adenoidi). Arch. ital. di otol. [etc.], Torino, 1898, vii, 90–95.—**Guthrie** (J. A.) Possibilities of cocaine. N. York M. J., 1898, lxvii, 315.—**Harris** (T.) On dry mouth or xerostomia. Am. J. M. Sc., Phila., 1898, n. s., cxv, 312–317.—**Hartman** (J. H.) A case of angeioma of the tonsil, with recurrence of the same three years after removal. Tr. Am. Laryngol. Ass., 1897, New York, 1898, 126.—**Hebb** (R. G.) Case of tuberculosis of the tongue. Tr. Path. Soc. Lond., 1896–7, xlviii, 62.—**Heckard** (W. A.) The use of the disk. Indiana Dent. J., Indianap., 1898, i, 197.—**Heidé** (R.) Le formagene; composition; action; emploi; expériences bactériologiques et microscopiques. Odontologie, Par., 1897, 2. s., iv, 461–464.—**Heidé et Aubeau.** Restauration buccale et faciale. *Ibid:* v, 5–10, 2 pl.—**Hektoen** (L.) Carcinoma of the pharynx, with extensive and erratic cornification. Phila. M. J., 1898, i, 518.—**Hennebert.** Empyème aigu de l'antre mastoïdien; abcès extradural; trépanations mastoïdienne et crânienne; guérison. Rev. internat. de rhinol., otol. et laryngol., Par., 1898, viii, 36–38.—**Hewitt** (F.) Alcuni cenni importanti riguardo all' uso degli anestesici per operazioni odontistiche, con ispeciale riguardo alla posizione. Gior. di corrisp. p. dentisti. Milano, 1897, xxvi, 325–334.—**Hiatt** (N. W.) Necrosis. Indiana Dent. J., Indianap., 1898, i, 13–16.—**Hill** (L.) The treatment of chloroform collapse. Treatment, Lond., 1897, i, 126.—**Hinman** (H. B.) An interesting case of sloughing of the gums. Ohio Dent. J., Toledo, 1898, xviii, 105.—**Hobday** (F.) A new apparatus for the administration of chloroform. Treatment, Lond., 1897, i, 218–220.—**Hoff** (N. S.) Analgetica auf zahnärztlichen Gebiete. J. f. Zahnheilk., Berl., 1898, xiii, no. 6; no. 7; no. 8.—**Horne** (J.) Cyst of epiglottis. J. Laryngol., Lond., 1898, xiii, 65.—**Hunt** (J. M.) A recurrent membranous pharyngitis of nineteen years' duration. *Ibid:* 55.—**Inglis** (O. E.) Arsenical necrosis. Internat. Dent. J., Phila., 1898, xix, 76–86.—**von Isoo.** Die Hygiene der Mundhöhle. Med.-chir. Centralbl., Wien, 1898, xxxiii, 86–83.—**Jameson** (A.) The personal equation. Indiana Dent. J., Indianap., 1898, i, 1–12.—**Jung** (C.) Sulla lega di platino e argento e suo uso. Gior. di corrisp. p. dentisti, Milano, 1897, xxvi, 335–339.—**Jurist** (L.) A case of pseudo-membranous (diphtheroid) stomatitis, caused by the streptococcus pyogenes. J. Am. M. Ass., Chicago, 1898, xxx, 649–651.—**Kahlo** (H. C.) Antiseptics. Indiana Dent. J., Indianap., 1898, i, 234–239.—**Kalt-Reuleaux** (O.) Die Vertreter der Medizin und Zahnheilkunde in Transvaal. Med. Rundschau, Berl., 1897–8, 139.—**Kinscherf.** Die kurze Aethernarkose. Vereinsbl. d. pfälz. Aerzte, Frankenthal, 1898, xiv, 24–27.—**Kirk** (S. T.) Practical observations on cataphoric anæsthesia. Indiana Dent. J., Indianap., 1898, i, 230–234.—**Kirstein** (A.) Nageltroicart für die Oberkieferhöhle. Allg. med. Centr.-Ztg., Berl., 1898, lxvii, 151.—**Kunert** (A.) Klinische Erfahrungen mit Formagen. Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 57–62.—**Langmaid** (S. W.) Submucous hæmorrhage of the vocal cords. Tr. Am. Laryngol. Ass., 1897, New York, 1898, 17–23.—**Lauwers.** De la ligature préventive de la carotide externe dans le traitement des tumeurs de la cavité buccopharyngienne. Ann. Soc. belge de chir., Brux., 1897–8, v, 241–246.—**Lee** (E. H.) A case of extirpation of the soft palate and tonsil for carcinoma. Medicine, Detroit, 1898, iv, 89–97.—**Leven** (E.) Zur Symtomatologie der Stomatitis Mercurialis. Monatsh. f. prakt. Dermat., Hamb., 1898, xxvi, 194–196.—**Libby** (H. F.) A method of inserting gold fillings with the use of hand burnishers, as practiced exclusively for twenty years. Dental Cosmos, Phila., 1898, xl, 169–188.—**Lincoln** (R. L.) The dentist as seen by his patients. Pacific Med.-Dent. Gaz., San Fran., 1898, vi, 68–70.—**Locke** (W. S.) Physical changes that take place in tissue under pressure. Dental Reg., Cincin., 1898, lii, 115–125. ——— *Also:* Ohio Dent. J., Toledo, 1898, xviii, 130–139.—**Lund** (F. B.) The place of local anæsthesia in surgery. Internat. Dent. J., Phila., 1898, xix, 152–161.—**Luzzato** (M.) Un caso di emiatrofia della lingua. Boll. d. clin., Milano, 1897, xiv, 512–521.—**McManus** (C.) One of the present needs of the profession; a history. Dental Cosmos, Phila., 1898, xl, 20–27.—**Manz** (O.) Ueber regionäre Cocainanästhesie. Centralbl. f. Chir., Leipz., 1898, xxv, 177–181.—**Martin** (G. S.) Antiseptics and germicides in dentistry. Dominion Dent. J., Toronto, 1898, x, 58–61.—**Miles.** A patient after excision of tongue for malignant disease. Tr. Med.-Chir. Soc. Edinb., 1896–7, n. s., xvi, 78.—**Miller** (A. G.) On the œtiology and treatment of glandular enlargements in the neck. Brit. J. Dent. Sc., Lond., 1898, xli, 97–105.—**Mingazzini e Lombi.** Paralisi unilaterale dei nervi cerebrali prodotte da tumore originatosi nell' antro di Highmoro. Boll. d. mal. d. orecchio, d. gola e d. naso, Firenze, 1898, xvi, 28.—**Minshall** (F. W.) A case of acute septicæmia. Brit. J. Dent. Sc., Lond., 1898, xli, 105.—**Moeser** (E.) Apparat zur Behandlung eines schweren Oberkieferbruches. Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 63.—**Moskovitz** (I.) Ketoldali primaer tonsillaris sanker esete. [A case of primary chancre on both sides.] Orvosi hetil., Budapest, 1898, xlii, 83.—**Moure.** De l'ouverture des abcès amygdaliens. J. de méd. de Bordeaux, 1898, xxviii, 76–78.—**Mumford** (J. G.) The medical and surgical treatment of hare-lip. Boston M. & S. J., 1898, cxxxviii, 198–201.—**Musmeci** (F.) Sull' uso del iodoformio per le cure asettiche delle cavità cariate e sulle otturazioni miste nelle carie profonda dei denti. Gior. di corrisp. p. dentisti, Milano, 1897, xxvi, 293.—**Neiswanger** (C. S.) The prominent causes of failure in the use of electricity in dentistry. Dental Cosmos, Phila., 1898, xl, 9–13.—**Newcomb** (J. E.) Guaiacol as a local anæsthetic in minor operations on the nose and throat. Tr. Am. Laryngol. Ass., 1897, New York, 1898, 10–17.—**Noel.** L'hygiène buccale au régiment. Rev. odont., Par., 1898, xvii, 20–29.—**Oliver** (T.) Acute dilatation of the heart, occurring in the course of cancrum oris. Edinb., M. J., 1898, n. s., iii, 251–253.—**Ortuani** (A.) I diversi metodi di amputazione della lingua per epitelioma in confronto al metodo termo-galvanico. Clin. chir., Milano, 1897, v, 412; 459.—**Ottolengui** (R.) Dental laws of the United States. Items Interest, N. Y., 1898, xx, 161–164, 1 map.—**Palmer** (H. B.) Notes of a case of cocaine poisoning. Lancet, Lond., 1898, i, 718.—**Pantaleone** (R.) Noma per sifilide. Clin. dermosifilopat. d. r. Univ. di Roma, 1897, 65–75.—**Parker** (C. B.) The administration of pure oxygen in chloroform anæsthesia.

Tr. Ohio M. Soc., Norwalk, 1897, 132–139.—**Pearsall** (W. B.) On the linear determination of the human tooth form. J. Anat. & Physiol., Lond., 1897–8, xxxii, 219–222.—**Pennington** (S. C.) Nitrous oxid. Dental Cosmos, Phila., 1898, xl, 18–20.—**Pitsch**. De l'emploi du bromure d'ethyle comme anesthésique dans les cas d'extractions multiples. Odontologie, Par., 1898, xviii, 49–54. [Discussion], 67–71.—**Poteau**. Cas d'hematome sous-muqueux sublingual consécutif à l'extraction d'une dent chancelante. *Ibid:* 62.—**Reardon** (T. J.) A unique case of edema of the superior surface of the soft palate. Boston M. & S. J., 1898, cxxxviii, 251.—**Richardson** (C. W.) A case of chronic abscess of the tongue. J. Am. M. Ass., Chicago, 1898, xxx, 479.—**Rogers** (J.) The philosophy of exudative inflammation. Internat. Dent. J., Phila., 1898, xix, 65–76.—**Romme** (R.) Les nouveaux méfaits des végétations adénoïdes du pharynx. Rev. mens. d. mal. de l'enf., Par., 1898, xvi, 84–91.—**Rose** (C.) Ueber den Einfluss der Bodenbeschaffenheit auf den Bau der menschlichen Zähne. J. f. Zahnheilk., Berl., 1898, xiii, no. 7.—**Roughton** (E. W.) The treatment of empyema of the antrum of Highmore. Treatment, Lond., 1897, i, 217. ——— Empyema of the antrum of Highmore. Laryngoscope, St. Louis, 1898, iv, 159–163.—**Sauves**. Etude critique des meilleurs procédés d'anesthésie pour la chirurgie dentaire. Odontologie, Par., 1898, xviii, 93–114. [Discussion], 122–128.—**Schwartz**. Tumeur de la parotide; néostomie du canal de Sténon. Bull. et mém. Soc. de chir. de Par., 1898, n. s., xxiv, 39.—**Seligmann** (J.) Uebersicht über die Entwicklung der Zahn- und Kieferprothese bis in die neuere Zeit und kurze Angabe des Standpunktes derselben in der neuesten Zeit. J. f. Zahnheilk., Berl., 1898, xiii, no. 5.—**Siegel**. Weitere Mittheilungen über Uebertragungen von Maul- und Klauenseuche auf Menschen. Hyg. Rundschau, Berl., 1898, viii, 184–188.—**Siegel** (E.) Ueber die Narcose. Aerztl. Prax., Würzb., 1898, xi, 49–52.—**Siffre**. Contribution au traitement de la carie du 3e degré. Odontologie, Par., 1898, xviii, 114–116. [Discussion], 128. **Siklóssy** (G.) Szemhéj és arczrák mütett esete. [A case of operation for cancer of the cheek and eyelid.] Orvosi hetil., Budapest, 1898, xlii, 83.—**Silk** (J. F. W.) The selection of the anæsthetic. Treatment, Lond., 1897, i, 124. ——— Notes on the administration of nitrous oxide. *Ibid:* 316.—**Smith** (A. H.) Méthode simplifiée pour préparer des coupes de dents et de tissu osseux, permettant de demontrer les rapports anatomiques existant entre les tissus durs et les tissus mous. Odontologie, Par., 1898, xviii, 63–67.—**Smith** (H. T.) The coagulation theory. Dental Reg., Cincin., 1898, lii, 101–109.—**Smith** (S. C.) Effects of various trades on the teeth. Dental Rec., Lond., 1898, xviii, 49–55.—**Snyder** (W. D.) That troublesome nerve, or painless dentistry. Ohio Dent. J., Toledo, 1898, xviii, 125–130.—**Somers** (L. S.) Pharyngitis herpetica associated with menstruation. Phila. M. J., 1898, i, 386.—**Spaulding** (J. H.) Dents à tube pour "bridge work." Odontologie, Par., 1898, xviii, 116–118.—**Spencer** (W. G.) Separation of old-standing adhesion of the soft palate to the pharynx. J. Laryngol., Lond., 1898, xiii, 62.—**Stevenson** (N.) Diagnosis of empyema of the antrum. Brit. M. J., Lond., 1898, i, 554.—**Stewart** (D. D.) Concerning the blue-line in the gums in lead-poisoning. Tr. Coll. Phys., Phila., 1897, 3. s., xix, 74–91.—**Stillson** (H.) Spasmodic closure of the glottis in the adult. J. Am. M. Ass., Chicago, 1898, xxx, 467–469.—**Strassmann** (F.) Der Tod durch Chloroform in gerichtsärztlicher Beziehung. Berl. Klinik, 1898, Hft. cxvi, 1–17.—**Sudeck** (P.) Ueber Lokalanästhesie. Deutsche med. Wchnschr., Leipz. u. Berl., 1898, xxiv, 125.—**Taft** (J.) The influence and power of association. Dental Rev., Chicago, 1898, xii, 167–171.

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# LIST OF UNITED STATES PATENTS

## PERTAINING OR APPLICABLE TO DENTISTRY

### ISSUED DURING MARCH, 1898.

*March 1.*—No. 600,067, to A. Geiger. Closure for vulcanizers.
" *8.*—No. 600,135, to Arthur W. Browne. Electrical surgical engine.
" " No. 600,243, to Henry Case and Edmond D. Shaw. Angle attachment for dental hand-pieces.
" " No. 600,257, to Courtland G. Capwell. Dental separator.
" *15.*—No. 600,604, to Wm. H. Baird. Device for swaging gold plate for crown- and bridge-work.
" *22.*—No. 600,924, to Louis T. E. Methot. Dental engine.
" " No. 601,057, to Wm. A. Johnston and Arthur W. Browne. Gas-administering apparatus.
" " No. 601,178, to Joseph M. Strout. Dental matrix retainer.
" " No. 601,208, to Chas. H. King. Blowpipe.
" *29.*—No. 601,395, to John W. Gilbert. Dental engine hand-piece.
" " No. 601,396, to Merrill W. Hollingsworth. Cataphoric electrode support.

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# ORIGINAL COMMUNICATIONS.

## A METHOD OF INSERTING GOLD FILLINGS WITH THE USE OF HAND BURNISHERS, AS PRACTICED EXCLUSIVELY FOR TWENTY YEARS.

BY DR. HENRY F. LIBBY, BOSTON, MASS.

(Concluded from page 281.)

### THIRD PAPER.

IT has been my desire, thus far, to give as briefly as possible practical directions for this method of inserting gold fillings. It seems needless to continue this essay beyond the treatment of a few more simple cavities.

The next cavity to be considered is shown in Fig. 38, where the central has lost a portion of its incisive edge. This would commonly be restored to its normal shape with gold, as also others, including fractures. There are no specific directions for shaping these cavities. The thought uppermost in the mind of the operator is to hold the plug firmly, and at the same time to prevent the weakening of the remaining portion of the tooth, with a careful consideration of the pulp. I would avoid deep undercuts, as they are not required in the firm lodgment of the filling. When it is fully appreciated that gold is welded into a dense mass by simple rubbing, the chance of danger from delicate walls or deep retaining grooves becomes a secondary consideration. In cutting retaining grooves, or in seeking for anchorages, I am not hindered by the thought that there will be weak points that cannot be filled with safety.

In filling these cavities, the corkscrew and foot points (Fig. 39) are employed to fill out flush; then the flat burnisher (Fig. 40) may be used to advantage for the sake of rapidity and to keep an even surface. Using long, narrow strips of No. 60 folded gold, lapping them back and forth, will hasten the operation. The question naturally arises, will such malleable gold withstand the attrition of mastication? Most emphatically, yes. I have under my care teeth that are covered from one-sixteenth to an eighth of an inch on the cutting-edges, or shoed, as many speak of them, which have served their purpose for at least fifteen years. It may be asked, what appearance do these fillings have on the grinding-surface? You would say, battered. This condition, if ever seen, must come from its not being tempered, and hardened with malleting. I have seen these surfaces so beaten that the edges overlapped, and it became necessary to polish them off after years of wear. Here, then, we have a tough, elastic quality, the density of which would not be questioned by any one who undertook to reduce the size with sandpaper disks or corundum stone.

Fig. 38.

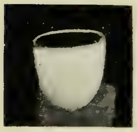


Fig. 39.

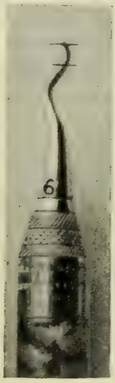
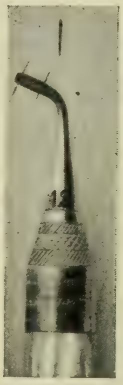
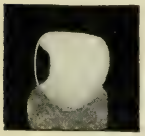


Fig. 40.



I shall next consider pin-head cavities. In these gold is not supposed to be burnished, for the reason that the sides of the instruments cannot be used. The gold is simply packed by direct hand-pressure. I think it will be admitted that we have an unusual advantage in condensing gold in any cavity with these instruments with direct pressure, or burnishing, for it must be plainly seen that a denser filling may be made, with less danger of fracturing the tooth, and slipping of the hand, by the use of a short, unyielding point, with a firm grip on a handle that is five-sixteenths of an inch in diameter as compared to those in common use.

Fig. 41.



The cavities we are most often asked to treat in the incisor teeth are shown in Fig. 41 as one illustration. If the gold is to be seen at all after the filling of the cavity, I do not hesitate to bring it over the curved approximal surface sufficiently to show that it is filled with this material. It has been an error in my practice in years past to leave these in such relation to each other that the outlines of two fillings nearly approximate have cast dark reflections, one upon the other, in such a manner that the appearance might suggest decay, or neglected teeth. When gold is properly placed in the cavity of a tooth, and is carefully dressed to a dull finish, the gleam of high polish is less noticeable, and the gold becomes a restorative that is usually considered in good taste, and certainly gives the appearance of neatness. To retain a filling in a cavity of this type a slight undercut is made at the cervix, and some form of anchorage opposite to this. The starting gold pit, or pits, are made, and into them the gold is packed by direct pressure, and outwardly increased so that the side curve of the corkscrew reaches its surface with ease. After the cavity is two-thirds filled, the obtuse flat burnisher shown in Fig. 40 completes the filling so deftly that the finishing becomes a trifling matter.

It may prove of timely interest in this place to allude to some recent experiments with Dr. E. de Trey's solila gold preparation, and their application to this method. Not many weeks since, an accident which flooded a filling with saliva occurred when the filling was about completed. After drying the filling I did not take special care to freshen the burnished surface or roughen it in any way; simply placed a piece of De Trey gold of suitable size on the original filling and burnished it to the mass without the least effort, and it cohered perfectly, so far as I know. This could not have been accomplished with so little inconvenience by using the ordinary foil. This comparatively new form of gold is unusually attractive, and I alternate between No. 40 folded gold and No. 2 De Trey's on the same filling, and there is every evidence that they have similar attributes. I am convinced that at least one-third less time is consumed in making what has every appearance of being a perfect filling in a cavity of large dimensions. After carefully noting the directions given in the pamphlet recently mailed to me, and viewing the instruments, I had no hesitation in trying it. The first impression I had of its qualities was its cohesive susceptibility,—the second was its density. It seemed to solidify with equal compactness, both under direct point pressure and rubbing pressure. The moment the burnishing begins the surface illuminates, which is proof to my mind that it is condensed. It does not seem as ductile, neither do I note the plasticity or tendency to spread that is noticed in foil preparations. The crystals impress me as being so arranged in the process of manufacturing that they stand in readiness to condense under immediate contact. This characteristic I discovered when the fillings were nearly completed, and when we would wish to overlap the enamel wall I find the gold crumbles off at any sharp angle and the crumbs drop. This is not an indication that the contact with the enamel is defective. I certainly feel confident of its adaptability when forced against the tooth's structure by molding. In condensing with this gold, the tendency is to use more pressure than with No. 40 folded gold. This is necessary to bring the surface to a burnished condition. In comparing the handles of my instruments with those in the illustrated pamphlet, and especially where the gripping portion of the handle by the thumb and fingers is brought into action in solidifying, I think this gold packed with my treatment would not lose any of its special qualities. The larger corkscrew points are better adapted for point packing and side rubbing with this gold.

The last cavity of the incisors to be considered is a cervico-labial, shown in Figs. 42 and 43. It is complex and difficult to manage unless some adequate device is used to give abundant room to reach the abraded surfaces. The clamp becomes necessary in following out this scheme of working, with the thumb, pressed against adjacent teeth, acting as a fulcrum to prevent slipping. The reverse view of the clamp clearly shows that the pivotal shoe, or pad, renders it comparatively painless in all operations of this kind on the bicuspids and incisors. It seems a waste of time to dwell on the preparation of this cavity, and I will simply call attention to the starting pit which is at the right of it. The greater portion of the cavity is filled with the obtuse flat-point burnisher.

We will now pass to the occlusal cavities in the bicuspids and molars; there are no suggestions of importance to be given in shaping these. The fillings are started with non-cohesive gold, which may be made dense enough to form a base for the cohesive work. Fillings of this kind are matured very quickly, as long strips of cohesive gold are rapidly condensed with the larger sizes of corkscrew points. Having heard conflicting reports of the value of gold and platinum, I have not even tried it as a filling-material. In the June issue of the *International Dental Journal* for 1895, I printed a paper, with illustrations and descriptive matter, which describes a series of experiments taking up various methods of manipulating gold. These experiments were performed by Dr. Thomas B. Hayden, who was then fresh from the Harvard Dental School, and had not acquired any one method that would prejudice him. In Fig. 44 is shown a block of ivory diminished to two-thirds of its original size. It is in two sections, which can be firmly bolted together. In the center you will observe a fissure with a depth sufficient to admit a pear-shaped bur. The motive for choosing ivory is its close resemblance in structure to the tooth-substance. Dr. Hayden assumed the responsibility of filling the fissure. It was made in this peculiar form and size for the purpose of demonstrating the adaptability of gold to the walls of small cavities. I concluded if the interior of the fissure were cut with a bur and left in that condition, it would resemble very closely a prepared cavity. Furthermore, if it were comparatively narrow it would come nearer to the size of cavities that are

FIG. 42.

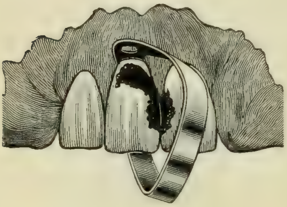
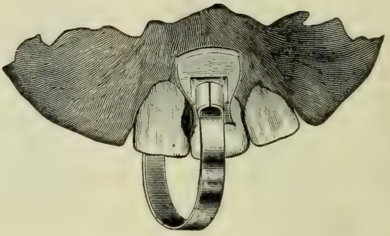


FIG. 43.



the most troublesome in making perfect stoppings. The length was desirable for the sake of microscopic investigation. It will be seen, therefore, that the experiments were intended to give to the operator plain facts, to show the imperfections of ordinary gold work to a class that is annoyed and perplexed with mechanical devices for condensing gold. In every case Dr. Hayden employed one manufacturer's gold, using No. 3 cohesive foil, rolled in rope form, with sheets divided in thirds. He began the work at the extreme end, and continued in a diagonal manner until it was completed. The time was carefully noted, and his own good judgment dictated his procedure. The six methods that he took up were labeled and submitted to the microscopist, Mr. H. S. Smith, who used every endeavor possible to produce the best results. In each instance the sides of the gold bars after the ivory sections were unbolted were exposed to the lenses, and the best work brought into focus. In all of these exposures the light and dark patches represent perfect and imperfect adaptation of the gold to the walls of the fissure. In making the bar shown in Fig. 45 (which, together with the figures following, and the discussion from this point to the closing paragraphs, are reproduced here by the kind permission of the International Dental Publishing Company), Dr. Hayden used a Harvard foot plugger, and I an eight-ounce lead mallet. The time required for this work was one hour and twenty minutes; weight, twenty-one grains. In the next figure the work of Dibble's pneumatic mallet is shown. (Fig. 46.) In this we meet with deeper depressions, an indication of less density, yet it shows an interlacing of structure that is interesting.

FIG. 44.

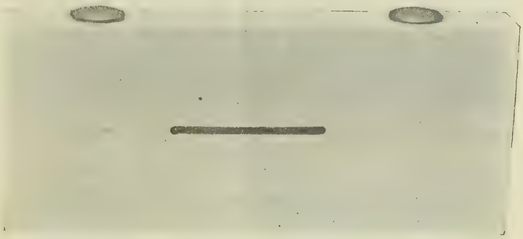
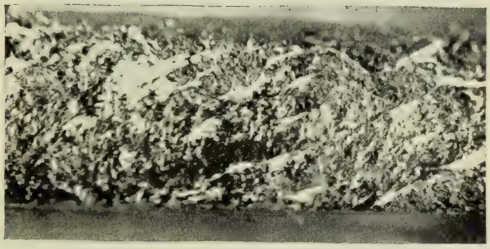


FIG. 45.



Time required, one hour; weight, ten grains. In Fig. 47 is represented the work of the Snow & Lewis automatic mallet. Here we have a very decided improvement over the hand and pneumatic mallets, the texture more homogeneous, a quality that we are seeking. The poor adaptations, what are commonly called rat-holes, are less pronounced. Its contact with the surface of the cavity is patchy, but comparatively good. Time of filling, two hours: weight, fourteen grains. Fig. 48 shows the work of the Bonwill mechanical mallet, presenting a similar appearance to the work of the automatic, but not quite so boldly distributed in masses, though otherwise apparently very dense in structure. This was filled in one hour and five minutes; weight, twelve grains. Fig. 49 shows the hand-pressure method. After what has been seen already, we are prepared to find a porous structure, with pits showing that serrated instruments produced them, and a cohesive interweaving of the lamina of gold. Time of filling, one hour and thirty-five

FIG. 46.

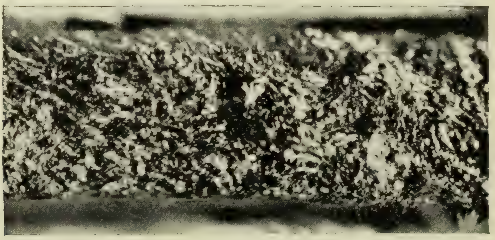


FIG. 47.

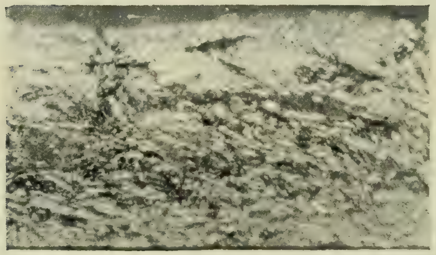
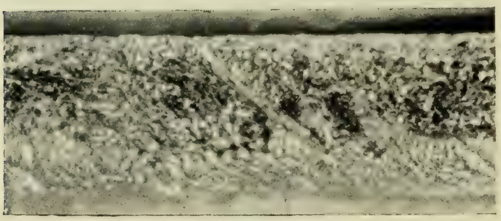


FIG. 48.



minutes; weight, thirteen grains. The next illustration (Fig. 50) shows the burnishing method. In this we have less deep cavities and pits, a more fibrous structure, and a closer union with the wall, for which we are aiming. Time of filling this was one hour and thirty-five minutes; weight, fifteen grains. The accompanying Fig. 51 shows the result of my work under the same conditions. Here we have a fibrous appearance, homogeneous density, and such a union as we would expect when a plastic material is burnished against dense walls.

FIG. 49.

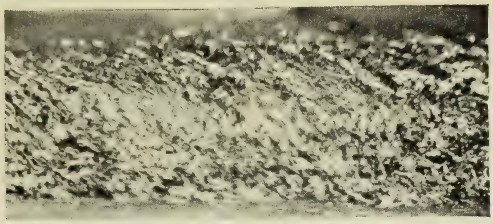


FIG. 50.

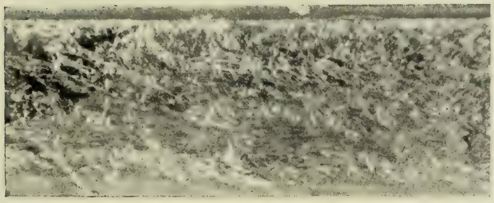
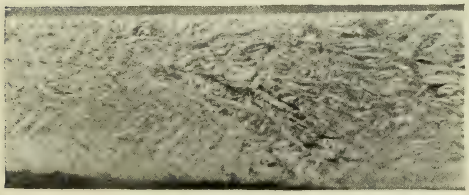


FIG. 51.



What have we learned by this analysis? First, that the hand mallet pounded more gold into a given space than any other method, and yet its object—viz, adaptation to the walls—was far from being perfect.

In connection with this result, Dr. Ottolengui, in his book on "Methods of Filling Teeth," says, "The theory that the more gold one can crowd into a cavity the better the result is not true," and asserts the supreme demand upon any filling to be "that it shall present a durable surface, and be in close contact with all its walls." I am convinced that he has the sympathy of the fraternity in this matter.

Of the work of the Dibble pneumatic mallet comment is unnecessary as regards its structure and weight.

The automatic mallet is the universal instrument for filling teeth. What phenomena do we observe under its treatment? In gold work of all descriptions the inherent propensity of the metal for becoming hardened and tempered by hammering or malleting is universally recognized. In our laboratory work we redeem the soft, elastic quality by repeated annealing. Can we do this in malleting in a gold filling? Certainly not. Then what happens? We are constantly tempering and hardening the mass, making it more obstinate in conforming to our wishes, less elastic and fibrous, and less suited to our needs, as the example plainly shows in the deep pits and grooves seen against its walls. Is the tempering and hardening a desirable feature toward perfect work? To my mind it appears desirable only for one purpose, that of giving strength, —an acquisition not to be ignored, but to be acquired in a more humane and satisfactory way.

The references I make to the Bonwill mechanical mallet are from experienced operators. Dr. Louis Jack refers to it as being rapid in movement, and states that gold can be packed with great rapidity, and with very considerable density. The complaints of patients after they become accustomed to the great velocity are less than in most forms of effectual malleting.

Dr. Ottolengui prefers it to other mechanical devices for operating, and the comparison he makes of patients' choice between the use of this and the hand mallet is that fully ninety per cent. choose the Bonwill.

To solve the problem of hand-pressure I take great pleasure in referring again to Dr. Ottolengui, as I deem it a duty to the readers to accept an authority that has had, as it appears, an unbiased experience with all gold work. You will easily see that my opinion is worthless in personal practice with any of the accepted methods. Therefore I will repeat the words of the author of "Methods of Filling Teeth," in his paragraph, "How to Condense Gold": "The greatest good gained by hand-pressure is that gold remains more cohesive under this method than under any other," saying "that he had sufficiently tested it to feel safe in making the following dogmatic statement: the more gradual the pressure exerted upon gold foil, in condensing it, the less it loses its quality of cohesiveness, and, *vice versa*, the more sudden, sharp, or rapid the blow of the hammer, the less cohesiveness will be exhibited." This whole chapter on "Gold as a Filling-Material" is deeply interesting.

Referring to hand-pressure again, we place alongside of these remarks the results revealed by the microscope, noting their texture and weight.

In taking up methods of burnishing or welding gold, I find several very able writers who have touched on this theory with a doubt and uncertainty which have impressed the professional brotherhood with hesitation. For instance, Dr. Thomas Fillebrown, in a paper that was published in 1873, entitled, "Another Method of Packing Gold," describes very minutely the details that are necessary to achieve success with smooth steel points, stating that the manner of applying the force must be a steady pressure with only a slight turn of the point; any rubbing of the gold must be avoided; it destroys the cohesiveness of the surface so that more cannot be added.

Would not directions of this kind alarm any operator, and make him cling all the closer to his early teaching? Dr. Ottolengui has resorted to the burnisher for contouring when teeth have become sensitive from prolonged malleting, with satisfaction to his patients and to himself, and he impresses you that you should not proceed any further.

Dr. Herbst used burnishing points, rotating them with an engine. Dr. Frank Abbott found no difficulty in cohering gold with smooth points, and there are many readers who have burnished gold in some degree; and why is it to-day that dentists are afraid of undertaking this simple method of working gold? I think three words will explain it,—unsuitableness of instruments.

Nothing could be of greater importance to the individual dentist than the adaptability of his instruments to his needs; and in this matter there is, comparatively speaking, no supply to choose from. In closing let me add a hint for making patterns of instruments. These can be quickly made by taking a piece of copper wire of suitable size; the end may be flattened or pointed, by hammer or file, and a bit of wax molded on the point, tapering to any desired shape. Wax may be used in like manner for making handles. Of course these can be copied in steel or wood by most of our manufacturers. Let me show here a pattern as an example. (Fig. 52.)

As a final plea for short-shanked instruments, let me add one more illustration. (Fig. 53.) In this will be seen two forms of penholders, also an engraving tool. The smaller penholder was purchased of a specialist in card-writing. It will be noticed that this is largest at the grasping end. The short pen in this holder shows conspicuously the value of a short shank between handle and point in delicate work. The larger penholder was selected as the one most popular among business men. The engraving tool was obtained from L. Prang & Co., lithographers. This instrument is constructed like a lead-pencil, inasmuch as the steel is carried through the entire handle. The reason for this is twofold. First, as the point is subjected to a great deal of wear in cutting lithographic stone, it becomes necessary as a matter of economy; secondly, being of wood it can be tapered with a view to the practical requirements of grasping by the fingers. This tool, with the demands made upon it, is closely allied to those we are constantly using. The engravers naturally have a touch educated for delicacy and strength combined, yet the point is unyielding, and the handle of remarkable size when compared with those of the instruments we have been accustomed to use.

In closing this essay, let me repeat my statement that the crux of the whole matter lies in the form of instruments used. I have claimed for the method of hand-burnishing certain advantages over

FIG. 52.

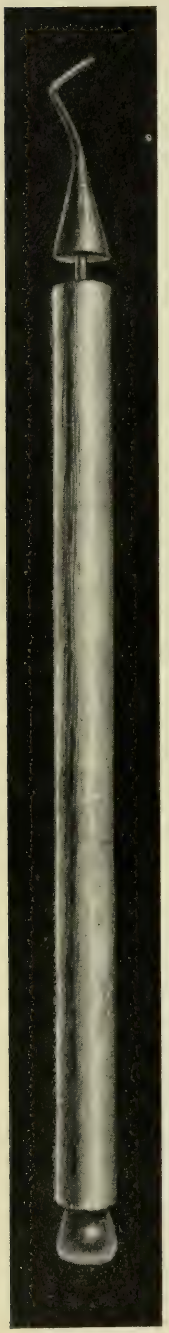
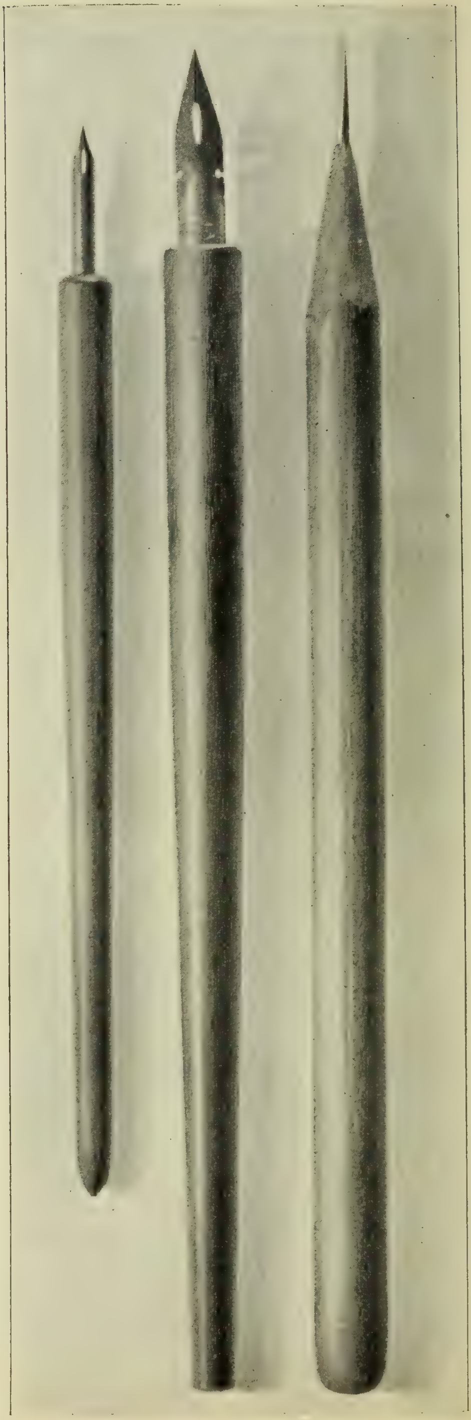


FIG. 53.



other methods; but it is my conviction that these advantages are not to be obtained except by the use of such instruments as I have shown, with large handles and with short shanks.

# MANIFESTATIONS OF SYPHILIS IN THE MOUTH.

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(Read before the New York Odontological Society, February 15, 1898.)

EIGHT years ago I had the honor to address this society upon "the dangers arising from syphilis in the practice of dentistry."* At the kind invitation of your distinguished president I shall try this evening to give a more practical value to the remarks then made by calling your particular attention to the mouth-lesions from which infection can take place.

Syphilis is a protean disease, not only capable of affecting every organ and tissue of the body, but also of imitating to a greater or less degree very many conditions and states depending on quite other causes. It is therefore no easy task to attempt to make perfectly clear its manifestations in the mouth,—for it must be acknowledged at the outset that sometimes the appearances are so *bizarre* and curious that even the most skillful cannot be certain in regard to the nature of a particular lesion. It may be further stated that in order to diagnosticate syphilis surely it is often necessary to know the history, and also to take into consideration very many signs and symptoms; it is not, therefore, always possible to consider and judge from a single lesion, whether it be in the mouth or on the skin, or in any other organ. It will be understood, therefore, in what may follow, that the diagnostic points indicated are but relative and partial, although the attempt will be made to indicate the salient points which may be of practical value.

In order to understand the danger from the manifestations of syphilis in the mouth, and the means of averting it, a few words must be premised in regard to the disease itself.

Syphilis is a specific disease, due to the entrance of a special poison, which multiplies rapidly in the system and can affect every organ and portion of the body. It is by no means necessarily a venereal disease, but is constantly being acquired in perfectly innocent manners, which need not be dwelt upon here, except to state that a number of authentic instances are on record, by reliable observers, where it has been acquired in connection with the practice of dentistry;† it has happened that both the dentist has acquired it from the patient and patients have acquired it through dental operations, from poison which has been conveyed on instruments, or otherwise from one suffering from the disease to another.

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***International Dental Journal*, August and September, 1890.

†"Syphilis in the Innocent," by L. Duncan Bulkley, M.D. New York, 1894; pp. 90, 190, 231, 232.

Soon after the entrance of the poison the person becomes syphilitic, and for a period is thoroughly permeated with the poison, so that the blood and certain secretions can again communicate the disease. The exact duration of the contagious period of syphilis has never been determined, although it is known that after a considerable time the danger diminishes greatly, and after some years it is not communicable, even though the patient may have some of the late or tertiary signs of the disease, it may be, even in the mouth. The virulence of the disease is also modified greatly by efficient treatment.

During the first year syphilis is certainly very contagious, and operations about the mouth should be undertaken with the greatest caution. During the second year, as well as during the first, and especially in smokers, there are apt to be mucous patches in the mouth which give off a secretion which is abundantly capable of causing a chancre, should it find a suitable opportunity. With each succeeding year, especially under proper treatment, the danger diminishes, and there are not many instances where infection has taken place after five years, although the disease is capable of hereditary transmission very many years later, showing that the virus does persist even for a long time.

The sources from which syphilitic poison may be received are four, and as all of them may at times relate to the practice of dentistry they may be mentioned, as they were in my former paper. These are: (1) The initial sore or chancre, in or about the mouth; (2) Mucous patches in the mouth or on the lips; (3) Syphilitic ulceration; and (4) The blood.

(1) *The chancre.* This is not very uncommon on the lips, and at the beginning is often thought to be only an innocent abrasion, or "a cold sore." But it will persist and gradually become a well-defined mass, and give off a terribly virulent secretion, often remaining for months, and symptoms of constitutional syphilis will appear. Occasionally a chancre will occur on the tongue, as in the instance of a patient of mine, which I mentioned in my previous paper, where the gentleman had been to his dentist to have a roughened tooth filed off; the dentist who did the work was undoubtedly exposed to the contagion, and without proper cleansing his instruments could have been the means of communicating the disease to others. Chancres are also not very uncommon on the tonsils, and also have been observed on the gums and elsewhere in the mouth.

(2) *Mucous patches.* These are slightly raw surfaces, of various sizes and shapes, which at one time or another are very apt to appear to a greater or less extent in the mouth in almost every case of syphilis. Mucous patches are a most fruitful source of syphilitic infection, and are the lesions against which special care must be exercised. The secretion from them, whether in a fresh state, or dried on instruments, napkins, or any articles, gives rise to a chancre and complete infection of constitutional syphilis.

Mucous patches differ so greatly in appearance and extent that it is difficult to describe them accurately. When newly developed they are of a redder color than normal mucous membrane, but later may become of a grayish white; elevated a little at first, they may become depressed by the loss of epithelial covering. They may be in oval patches of various sizes, or in streaks, while sometimes it is very difficult to determine their exact extent. They are always superficial lesions, and often do not cause much annoyance, so that the patient may readily attend to all the duties of life, and may go through considerable dental manipulation while having an abundant crop of mucous patches on the tongue, lips, or buccal cavity, as I have frequently known to be the case.

(3) *Syphilitic ulcerations.* These are less likely to be met with in the practice of dentistry, although I have known patients to seek relief for troubles about the teeth when there were syphilitic ulcerations about the mouth which could give rise to contagion. Generally they are so striking and also painful that they would be noticed at once, or the patient would avoid dental work from the pain in them.

(4) *The blood.* During the earlier stages of syphilis the blood is certainly contagious, and if drawn in any operation it could convey the poison in a cut or injury, or if left on instruments or apparatus, and thus conveyed to another. In my former paper I quoted a very striking case where chancre of the gum resulted from the operation of tooth-drawing; the patient was undoubtedly inoculated by means of blood or disease secretions left on an improperly cleansed forceps.

Such being the sources from which infection can come from the mouths of persons who have acquired syphilis, we may briefly consider some of the details in regard to the methods by which the disease is communicated in dentistry, and the methods of avoiding the danger; first, in regard to the dental operator, and second, in regard to protecting patients.

(1) *The dental operator.* Considering the well-recognized contagious character from mucous patches in syphilitic mouths, it is remarkable that there are so few instances on record of the infection of dentists, whose fingers are continually bathed in these secretions. It is undoubtedly due to the great personal care of the hands necessary in the profession. Physicians and surgeons have been much less fortunate, and numberless instances are on record where they have acquired chancres on the fingers from mucous patches. I myself have had over a dozen thus affected under my care.

It is to be remembered that an abrasion of the surface is necessary for infection, so that these and even hang-nails should be carefully guarded against. Illustrations have occurred where even momentary contact of an abraded surface has sufficed to acquire the disease, even where careful cleansing has taken place immediately afterward; too great care cannot therefore be exercised in having the hands free from any raw places through which the poison could gain entrance.

(2) *Guarding patients against infection.* It may seem somewhat out of place to speak to such gentlemen as compose this society

in regard to the simple matters of precaution about to be mentioned. But, as some may not heretofore have fully recognized the dangers arising from the syphilitic mouth, it is best to err on the safe side, and to briefly present the cautions which come to mind from a pretty full knowledge of the subject, and in doing so it will be necessary to repeat some of what was said on a former occasion.

The secretion from mucous patches, and also from the chancre, is very sticky and adherent, and when dried on an article forms a delicate coat, hardly perceptible. Nothing is known in regard to the length of time during which the virus is viable, but from what has occurred in medical practice it is believed that days, weeks, or perhaps months after an instrument or article has become infected it may again give off the poison and communicate the disease.

Simple washing may not be sufficient for proper cleansing, and special care should be exercised if there is reason to believe that there has been particular exposure to syphilitic infection. This can be accomplished by heat and certain disinfectants, antiseptics, or germicides. As in the case of surgery, heat is probably the safest and most convenient disinfectant, and thorough boiling, especially in a slightly alkaline medium, may be considered as an efficient prophylaxis against contagion. I will not take your time in discussing other measures of asepsis, with which all are familiar, but I will only urge that too great thought and care can hardly be expended in perfectly guarding against this poison.

Almost all the articles employed in connection with dentistry could be the means of communicating the disease; for even a blunt plugger which had been in previous contact with a syphilitic lesion, and bearing the poison on its surface, might slip and cause a wound of the soft parts through which the poison on it could be absorbed.

But some instruments would be more likely to be the conveyors of the poison than others, and among these may be mentioned burs and files; they are both more liable to retain the poison in their fine serrations, and also to convey it to the tissues by wounds inflicted. Also the articles connected with polishing the teeth; and I well remember, in times past, more than one dentist polishing my own teeth with pumice stone on a bit of wood, which had apparently been used for former patients. Rubber-dams and wedges, if carelessly employed a second time, could also convey the poison. Napkins would probably be efficiently cleansed by boiling.

I have now endeavored to go briefly over the subject of the manifestations of syphilis in the mouth, and to point out some of the dangers from them to the operator and to other patients, and the methods of avoiding the danger. A few words may be added in regard to the practical recognition of syphilis in the mouth.

First it may be recalled that, as was remarked at the opening of this paper, syphilis is capable of imitating many states or conditions dependent on quite other causes; and there are many alterations of mucous membrane about the mouth other than those of syphilis, with many of which you are undoubtedly familiar. Time and space would fail in an attempt to give any detailed consideration to these, and I must be content with a few suggestive hints.

Aphthous sores within the mouth will sometimes be strongly suggestive of syphilis, and, indeed, it is not uncommon to find them in the mouths of syphilitic patients, where the stomach derangement has been caused by the treatment given for the syphilis.

Glossitis of various forms and degrees may also exist, and be confounded with syphilitic lesions; the serpiginous form, often called "geographical tongue," will sometimes be very puzzling.

In the mouths of smokers, especially, we often get lesions which much resemble the white mucous patches of late syphilis; this *leucoplakia buccalis* is very apt to come in streaks, and on the sides of the buccal cavity, reaching down to the corners of the mouth. The tongue may also be much affected with this disease.

In addition to these superficial forms of mucous trouble we have epithelioma of the tongue, or buccal cavity, which often simulates syphilis very closely; lupus may also affect the gums.

Abrasions and ulcerations from sharp or irritating teeth will also be found on the tongue, and may be very suggestive of syphilitic disease.

Thus we see that the diagnosis of syphilis in the mouth may not be an easy affair, and it is necessary when any of these many lesions are found to be extremely careful lest the true nature of the trouble be mistaken, and infection occur when least expected, as is usually the case. Hence the necessity of perfect asepsis in connection with dental work.

One word in regard to the connection of the physician with the subject under discussion. I believe it to be the duty of the physician treating syphilis to acquaint the patient with the dangers to which he is exposing others, and if possible to prevent dental work being done, certainly during the early, contagious period of the disease. Should necessity arise for the aid of the dentist, the patient should frankly acquaint him with his condition, and the dentist take suitable precautions. Should doubt arise, the dentist should consult the physician in charge of the case.

If the physician in charge of a case of syphilis in the contagious period should have occasion to send a patient for dental treatment, he should acquaint the dentist with the dangers involved, just as he would inform the obstetrician, surgeon, or any other medical man who might be exposed thereby.

In conclusion, I beg to say that I have not wished to excite unnecessary alarm in connection with the subject under consideration; but having seen a great number of cases of syphilis innocently acquired, and knowing that in a large share of the cases the sources of contagion came from the manifestations of syphilis in the mouth, I feel that I cannot too strongly emphasize the danger, and urge the most careful attention whenever there is danger that the disease may be communicated from this source of contagion.

# BUCCAL MANIFESTATIONS OF SYPHILIS.

BY FANEUIL D. WEISSE, M.D., NEW YORK, N. Y.

(Address before the First District Dental Society of the State of New York, November 9, 1897.)

My experience, for years past, among dental students as teacher, and among dental surgeons as consultant, is that they have a dread of the buccal manifestations of syphilis that they may meet with in their practice, and a corresponding desire to know how they should deal with such cases that may come to them.

Syphilis is a systemic disease, due to the introduction of a virus into the blood, which, after a period of incubation after its introduction, develops a primary and local lesion at the point of introduction of the virus. During the period of incubation, it is held, the system is under the influence of the virus, which will develop the various subsequent manifestations of a systemic disease, because even where the local primary lesion has been excised within a few hours after its development, the systemic and constitutional symptoms of syphilis have always followed.

We see an analogy to the introduction of the vaccine virus in the process of vaccination,—the virus is introduced, then follows a period of incubation, then there obtains a development of the local lesion at the point of introduction of the virus, followed by a certain amount of lymphangitis radiating from the local lesion and adenitis with systemic disturbances.

The effect of the vaccine virus is to immune the system against the attack of variola, or at least to partially immune it, so as to modify it into varioloid. The introduction of the virus of syphilis develops the local primary lesion; the systemic accompanying symptoms and the several stages of the disease follow; the system thereafter being immune from subsequent infection.

With reference to what the virus of syphilis is, syphilographers are still in doubt. Statements have been made from time to time that a vegetable micro-organism had been found in the blood of syphilitic patients; but each time these opinions have been abandoned.

The period of incubation after the introduction of the virus into the blood varies according to different authors; but the majority of them hold that it is about from ten days to four weeks after inoculation that the primary ulcer may manifest itself. The disease develops by three stages:

Primary—the local, initial lesion or ulcer.

Secondary—skin-eruptions and mucous patches of the mucous membranes.

Tertiary—osseous and visceral lesions (gummata or granulation-tissue formation).

*The primary ulcer is the first external evidence of syphilis, no matter from what source the virus may have come.*

The source of contagion is a matter of interest to the dental profession. The virus is transmissible by application to a surface where epithelium has been excoriated, or the deeper tissues wounded, and the sources of the virus are,—

*First.* The exudation from a primary syphilitic ulcer.

*Second.* The exudation from a mucous patch (wherever situated).

*Third.* The exudation from a secondary skin-eruption.

*Fourth.* Inoculation of the blood from a patient in the secondary stage of the disease.

The primary syphilitic ulcer, or hard chancre, may occur at the buccal cavity from immediate or mediate contagion. I have seen the primary ulcer on the lip, the gum, and the pillars of the soft palate, but I have never seen one on the tongue. When it occurs upon the lip it presents an inflamed, spherical, hard mass, bedded in the substance of the lip, having at its surface an area of ulceration; a deep ulcer may form, if the surface is irritated by local applications. When it occurs upon the gum it is less swollen, simply presenting an area of ulceration; when upon the pillars of the soft palate, there is less prominence to the lesion and deeper ulceration.

Wherever the lesion is located at the buccal cavity, within a week or ten days one or more submaxillary lymphatic glands become enlarged, indurated, and painful, but rarely suppurate. The only condition that you can confuse with the primary ulcer and enlarged submaxillary lymphatic glands is the local ulcer of epithelioma, and the consecutive submaxillary glandular involvement; but the diagnosis is easy from the history of the case,—the short history of the syphilitic lesion determining its precise character.

I doubt if any dental practitioner ever sees a case of primary syphilitic ulcer at or in the buccal cavity, because, in all the cases which I have seen, the mouth is in such a condition that it occupies the entire attention of the patient, and he or she is not likely, under the circumstances, to require any dental operations.

Passing from the primary stage, the buccal cavity may be affected in secondary syphilis by ulcerations of the pillars of the soft palate and mucous patches of the mucous membrane.

When the pillars of the soft palate are affected they will be found to present an inflamed and congested appearance, with a certain amount of irritation of the throat; or there may be ulceration of the mucous membrane of the pillars of the palate, without the history from the patient of the exposure to a cold, but simply the development of the condition above described, with a certain roughness of the voice and soreness of the throat.

Concomitant with this there will have developed, in all probability, eruptions of the skin, giving further evidence that the secondary stage of the disease has been initiated. Farther on, in the secondary stage, mucous patches appear upon the mucous membrane, at the interior of the lips and cheeks, the dorsum and borders of the tongue,—most frequently at the borders of the tongue and the inner surfaces of the lips; seldom, if ever, at the floor of the buccal cavity.

The mucous patch is a reddish, round area; starting thus singly, several may run together, producing irregular forms of the patches. The surface is either even with the mucous membrane or a little depressed, covered with a whitish layer which you cannot scrape off; the surface does not bleed very readily, but there is a slight exudation from it. There may be but one mucous patch upon the border of the tongue, or upon the inner surface of the lip, and yet its exudation will contaminate the mucus of the buccal cavity, so that the mucus is capable of inoculating any abraded surface—skin or mucus—to which it may be applied. Sometimes you will see a fissuring of the vermilion border at the angle of the lip. Examine carefully, for there is often a mucous patch upon the mucous membrane surface at the angle.

Whenever you see the above-described mucous patch conditions in a patient's mouth, tell him to go to his family physician to be treated,—that his system is out of order, as indicated by the condition of the mouth.

Of tertiary buccal manifestations of syphilis we have the development of gummata or syphilomata,—syphilomata is much the better term. The structure of this tertiary evidence of syphilis is a new formation of granulation-tissue (granulation-tissue is the multiplication of the connective-tissue cells of a part) in the submucous plane or periosteum plane of the buccal parietes.

No two tissues can occupy the same place at the same time; as the granulation-tissue develops it leads, by pressure, to the degeneration and absorption of the surrounding tissue, in order to make place for the new-formed granulation-tissue.

Most frequently the syphilomata occur in the soft palate,—submucous plane,—rapidly developing a swelling of the same, which presents a livid, inflamed appearance, and then passes on to ulceration and sloughing of the granulation-tissue within. It must be remembered, as stated above, that as granulation-tissue develops it induces degeneration and absorption of the surrounding tissue, to make place for itself. When this granulation-tissue, as formed, sloughs, it is as a bung in a bung-hole,—you take out the bung and you have a hole left. So when this granulation-tissue sloughs out, it is found to have involved a destruction or sweeping away of more or less of the substance of the soft palate,—uvula, body, and even the pillars of the soft palate may be sacrificed. Under appropriate treatment, the ulceration may be arrested and healthy, permanent cicatrization of the mucous membrane surfaces will occur.

When the granulation-tissue develops in the periosteum of the buccal face of the hard palate, it will cause death of the horizontal plates of the palate bones and the palate processes of the superior maxillary bones, which will rapidly necrose and be exfoliated, leaving as a direct result communication between buccal and nasal cavities. This destruction of the soft and hard palate by syphilomata or gummata determines the condition of acquired cleft palate or perforated palate, in contradistinction to congenital cleft palate.

Sometimes the periosteal gumma is located at the palate process of the superior maxillary bones, and forward, involving the alveolar process of the same, and when thus located it will involve the destruction of the alveolar process in the loss of the teeth.

There is no other disease that will produce the rapid destruction of soft and hard palate, and at times alveolar process, but the tertiary stage of syphilis, which must of necessity have had a primary and secondary history, possibly ten, fifteen, or even twenty years previous. In such cases never attempt to make a prosthetic appliance for the acquired deformity of the soft and hard palate. Do not attempt to take an impression of the parts until the tissues have completely cicatrized and present a perfectly healthy surface.

Hereditary or congenital syphilis has its buccal manifestations of mucous patches, and as the temporary teeth appear they rapidly decay and are shed prematurely. As the child grows up, evidences of congenital syphilis in the buccal cavity are few; some cicatrices may present of previous ulcerations of the mucous membrane, and as the permanent teeth erupt they will present the condition known as the "Hutchinson peg-top teeth." The permanent central incisors come in irregularly, either converging or diverging; they are smaller than normal, the cutting-edge coming down to a point. When they do not come to a point the cutting-edge is notched, the notches ultimately being worn down, owing to the deficiency of enamel-development.

Parrott describes a peculiar condition of the cuspids and permanent molars—the crowns presenting transverse lines of depressions, dividing the teeth into two portions, one thicker than the other. The Parrott teeth, as an evidence of syphilis, is not concurred in by all syphilographers, but the Hutchinson peg-top teeth with notches at the cutting-edges is generally accepted as an evidence of hereditary syphilis.

I have, of course, not attempted to describe all the manifestations of syphilis in its various stages, but have confined myself to the disease as it presents itself at and in the buccal cavity in the primary, secondary, and tertiary stages of the disease, together with the buccal phenomena of hereditary disease.

The most important syphilitic lesion, for which dental practitioners should be on the lookout, are the mucous patches of the buccal cavity, which present not infrequently in the mouths of men as well as women patients as the secondary and even tertiary manifestations of the disease.

I stated before that the mucous patch has an exudation which contaminates the fluids of the mouth, rendering the buccal secretions a source of syphilitic contagion; but it is to be remembered that in a syphilitic patient without existing mucous patches in the mouth the saliva is innocuous, so that in the absence of mucous patches in a given mouth, even though the patient manifest other evidences of syphilis, you can perform dental operations with perfect safety. With existing mucous patches in a given mouth, the saliva of the same is capable of inoculating any excoriated surface of skin or membrane to which it may be applied, either directly from the mouth of the syphilitic, as by a kiss, or it may be passed from the syphilitic patient to another person by the media of spoons, cups, glasses, pencils, penholders, pipes, cigars, money (either coin or paper), napkins, etc., and lastly, instruments, surgical or dental; *but remember, that if communicated by any of these means from a* *mucous patch, the syphilitic lesion manifested by the patient, to whom the disease has been transmitted, is always a primary syphilitic ulcer or chancre on the person inoculated.*

Persons cannot be too careful as regards the promiscuous use of cups hanging to water-coolers in public places and conveyances.

I remember seeing a lady in one of our Fifth Avenue banks go to a desk to write out a check; her glove hampered her, and she put the penholder in her mouth while she took off her glove. I could not stand it, and I said to her that it was a very dangerous thing to put a public penholder in one's mouth. She started at my remark, as though she were insulted thereby; but I said to her, "I say this as a physician, that a penholder of this kind can convey a very serious disease to you," whereupon her expression changed, and she said, taking the penholder out of her mouth, rather startled, "Oh, thank you! thank you!"

Toys used by children have also been a source of disease, as they are so liable to put them in their mouths. Remember that these toys have been handled in shops by innumerable persons.

Of surgical instruments, it is related that a Eustachian catheter, in the hands of a prominent aurist, was the means of communicating syphilis to thirty or forty people. The ordinary catheter has also been a means of contagion.

In respect to dental instruments, I have yet to hear or read of a well-authenticated case of mediate contagion of syphilis caused by them. I would ask any gentleman present to state, in the discussion, if he has ever heard or read of such a case.

As dental surgeons you may be called upon by the general surgeon to put the mouth of a syphilitic patient in a healthy condition, the patient at the time having mucous patches,—namely, to extract roots of teeth, to file away any sharp, irritating projections, and to clean the teeth, as such conditions of the teeth aggravate very materially the comfort of the patient by irritating mucous patches that may be present. In such cases you must carefully examine your own fingers and see that they are free from any points of excoriation or abrasion; and all instruments used by you should be thoroughly disinfected after use. I hold that the dental surgeon should be as careful to disinfect his instruments after use in any operation —whether upon a syphilitic or non-syphilitic patient—as the general surgeon is. I do not think, however, that this is the general practice among dental surgeons, as it should be.

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## DR. BLACK'S CONCLUSIONS REVIEWED AGAIN.

BY G. V. BLACK, M.D., D.D.S., SC.D., JACKSONVILLE, ILL.

An answer to the gentlemen who presented reviews of Dr. Black's conclusions to the New York Institute of Stomatology, October 5, 1897, as published in the *Independent Practitioner* of December, 1897.

In the DENTAL COSMOS for May, 1895, I began a series of papers reciting the results of "an investigation of the physical characters of the human teeth in relation to their diseases, and to practical dental operations, together with the physical characters of filling-materials." In the first paragraph of this paper I said, "The subject, so far as it relates to caries of the teeth, has, it is believed, never been subjected to scientific inquiry. The ancient idea of medical men was that caries of the teeth was the result of inflammatory processes taking place within the structure of the tooth. With the advent of the chemical theory of caries it was almost immediately blended with that preceding it, so that it was, in a sense, made a part of the older theory of the causative influence of inflammation; the condition of the tissues of the tooth still, as interpreted, played an important *rôle* in the production of caries. In the course of years the interpretation gradually passed from the inflammatory hypothesis to the hypothesis of lack of lime-salts in the tissues of the tooth, as the factor favoring caries. In the more recent investigations of Miller, of Berlin, and others, which have unfolded the *rôle* played by micro-organisms in the production of caries of the teeth, little attention has been given to the immediate condition of the tissues acted upon. It may now be said that the hypothesis that the condition of the tooth-structure, in a large degree, renders the tooth susceptible or unsusceptible to caries, exists in full force in the minds of a large proportion of the members of the dental profession. We see constantly in the dental literature allusions to 'frail teeth,' 'chalky teeth,' 'hard teeth,' 'soft teeth,' 'dense teeth,' that this patient's teeth have become soft and are melting down rapidly, or that that patient's teeth are hard and firm in structure, etc. In a search of the literature for a basis upon which this idea of the differences in the condition of the tissues of the tooth rests, it is found to be an interpretation derived from certain clinical appearances. It often happens that the teeth of certain persons have manifested little or no tendency to decay for years, and then, almost without warning, rapidly progressive caries attacks a considerable number at once, melting them down rapidly. The interpretation is that such teeth have become soft. This has been especially noted in pregnant and nursing women; in persons from other countries who have located in the United States, and in persons of certain employments, especially candy-makers, millers, bakers, etc. In these also the teeth are said to become soft, and therefore decay rapidly. Also the idea is prevalent that such teeth have in some way lost lime-salts; have, in a word, become less dense in structure."

This was my estimate of the opinion held by the dental profession regarding the part played by the *condition* of the teeth themselves, rendering them susceptible to caries, or the reverse. The correctness of this opinion is most strongly reflected in the papers reviewing my article. Then after reciting the experimental research thoughtfully instituted and carefully carried out upon this point, I have said on page 400, same issue of the COSMOS, "These classifications therefore show conclusively that neither the density of the teeth, nor the percentage of lime-salts they contain, has anything to do with their liability to suffer from caries. In other words, the teeth of persons who suffer from caries are just as hard, just as heavy, and contain just as much lime-salts as the teeth of persons who do not suffer from caries. By the study of these exhibits in detail it will be seen that both the denser and the less dense teeth suffer from caries in about equal proportion."

It will be seen that this is an emphatic denial of the correctness of prevailing views of the profession upon this point, made after the most searching experimental examination of the density and proportion of lime-salts in teeth from a large number of persons classified as being bad, fair, and good, as to the occurrence of caries and a large number of teeth that had become carious, and of teeth that had not become carious. This makes up the issue that has been fairly placed before the dental profession.

Also, I say in the same article, page 401, "The hypothesis that teeth that decay rapidly are soft, or poorly calcified, is so interwoven with the thought of the profession, and of the laity as well, that by many it will probably not be easily given up."

This proposition also receives strong indorsement in the articles of review. I was therefore fully prepared for the representation that has been made upon this, the principal point raised by the results of the investigation. The gentlemen writing the reviews are representative men well known to the dental profession, and are persons whose views command general respect. They are Charles S. Tomes, F.R.S., London; Dr. R. R. Andrews, Boston, Mass.; Dr. S. B. Palmer, Syracuse, N. Y.; Dr. James Truman, Philadelphia, Pa.; Dr. George A. Maxfield, Holyoke, Mass.; Dr. E. A. Bogue, New York; and Dr. B. Holly Smith, Baltimore, Md.

All of these gentlemen discuss the propositions raised in the paragraphs quoted, and fully recognize their importance. While their papers are deliberate and very respectful in their tone, most of them present a strong inclination to cling to the older view, and yet a disposition to yield to the testimony adduced.

It is greatly to be regretted that only one of these gentlemen has made any attempt to disprove or confirm my findings by check experimental work of a similar nature. If all had done this, the evidence adduced would have been of the utmost value in the premises. But only Mr. Tomes has done this, of which he says (*International Dental Journal*, December, 1897, page 783), "Hence, surprised at Dr. Black's result that there was no difference between the proportion of lime-salts present in good and in bad teeth, and seeing that the record of his experiments revealed some sources of error, I undertook some check experiments myself, using every care and precaution known to me, with the result of not upsetting, but confirming his principal contention, that the difference was not to be sought in the amount of lime-salts present."

Notwithstanding this result, and after saying, "All that we can say, and so far I fully go with him, that between good and bad teeth there is not that difference in the total amount of salts that might have been expected, and that the difference in the total of salts, if there be one, is inadequate to produce well-marked effects in its physical characters," Mr. Tomes still is not convinced, apparently, that there is not some difference in the physical character of the teeth themselves that will account for the difference in their liability to caries, for he hastens to say, "For my own part, I still cherish the conviction that I can recognize by my eye a tooth of good quality and one of bad quality; and although I am compelled to abandon the vague idea which I once had that the bad tooth is deficient in lime-salts,—Dr. Black has demonstrated that that notion is untenable,—I am not prepared to give up the idea that there is a physical or chemical difference until the subject has been threshed out with far greater completeness than is the case at present."

I may say that it would require but a slight modification of the first part of this last sentence for me to fully indorse it, for I cherish the conviction that I can tell upon examination teeth that are liable to be destroyed and teeth that are not liable to be destroyed by caries. But in the three years of study of this subject since my article appeared, my conviction has become stronger than before that this difference does not pertain to the teeth themselves, but to their environment.

Mr. Tomes also offers some objections to the methods which I employed in the determination of the physical characters of the teeth, which in substance amounts to a plea for stereotyped methods of procedure in such work. This is very well if it were not for the very ugly fact that the rigid application of these would render the work in the extent and scope designed impracticable. Neither would it make any practical change in the results, except to render the decimal figures more exact. For instance, an objection is made to the use of decimals in entering the results as being beyond the possibility of accurate work. This objection might have been made, practically, by quotations from my article, for on page 360 I have carefully given the limits of error found in my work, and also the weights of the smallest masses of dentin employed. From these the possible error is readily made out. It does place the second decimal point within the limits of possible error, for a large part of the work and in those masses used weighing less than two hundred milligrams, the first decimal point begins to come partially within the range of error also, though never so as to invalidate it; for the most that could occur would be a slight range of the decimal figure. But suppose we exclude the second decimal point as given in the report of the results, what difference will it make? It would sweep away some of the finer generalizations that are based upon that decimal figure, but would make no difference in the results upon which the principal contention is based. I certainly would have preferred to use one gram of material, and in my preliminary work did use one gram of dentin, and check it with the smaller masses until I fully satisfied myself that the work with the smaller masses, taken as a whole, would represent the subject fairly. Then from the actual record of weight I calculated percentages to the second decimal point, the same as I would have done had I used the larger amount, believing that it would give the best view of the facts recorded by the weights.

Mr. Tomes bases several other criticisms of my methods upon variations from stereotyped methods that do not seem to me of much intrinsic value. While, as far as was practicable, I made my methods such as to give absolute correctness, this was not so much the object as correctness of comparison. The principal object sought was to compare one tooth with another throughout the series in all of the points of examination, and to that end every *condition* of the material was most carefully guarded. A large amount of time was spent preliminary to the work in studying various processes, practically, to the end that the whole work should be thoroughly systematized, and after the beginning of the count proper no changes in method should occur. This was found to be most important to successful work of this nature.

I should like to generalize the presentation made by the other gentlemen reviewing my article, but their views are so at variance as to make that quite impracticable.

For the short, terse article by Dr. B. Holly Smith I have nothing but commendation. His note in regard to child-bearing women is well and forcibly put, as are also his remarks as to possible "long-standing misconceptions of the profession."

Dr. E. A. Bogue seems to admit the main contention, and yet is not quite willing to do so, for while he admits, apparently, that the environment is the principal factor in caries, and introduces some cases to show that teeth very faultily formed may stand well, and will retain fillings well when some cavities have occurred, he seems much troubled by teeth "soft to the cutting-instruments and of a chalky feel," and "the hard teeth that will strike fire with an instrument." He enters into a discussion of the forms and colors of the teeth that he would regard as of good and bad quality. It is my opinion that any one of us who has had long practice and has been a careful observer will be able to say that teeth of certain persons whose mouths we have examined will not suffer from caries, and that the teeth of certain other persons will certainly be destroyed, unless the best of care be observed, as Dr. Bogue has indicated. While we would not differ much as to this prognosis, we would probably differ greatly as to our expression of the signs upon which the prognosis is based. Heretofore we had supposed that what we termed good teeth were hard, dense teeth, and have been in the habit of interpolating that expression into our descriptions of them. While I have never claimed, and do not now claim, that there is no difference in the hardness of normal teeth to cutting-instruments, I do claim that there is much misleading extravagance in the expressions used in regard to it. Much of the apparent difficulty experienced in cutting so-called hard teeth in the preparation of cavities is due to faulty position, lack of opportunity, or to the manner of approach; also, the keenness of edge, thickness or thinness of edge, and the adaptation of size and form to the case in hand, and the particular direction of application of force, are important factors, and produce differences of tactile response. As a profession we have had very little teaching of practical excavating, and insufficient study of the histology of the teeth with reference to excavating. Very few dentists know the essential rules of procedure sufficiently well to cut normal enamel with facility. Enamel is hard, and unless approached in such a way as to separate the enamel-rods, steel instruments will not cut it readily. When one strikes fire with his steel instrument upon enamel he has made a mistaken effort, and generally a failure in his attempt to cut. This is generally met with in the preparation of small cavities, or in extending into an unaffected area for anchorage or other purposes; therefore it is in material not affected by the carious process.

In the midst of this discussion Dr. Bogue thrusts forward notice of cases of three persons with evident malformation of the teeth in form and tissue, for he says, "The teeth of all of whom could be cut down about as a slate-pencil could," and yet these teeth remained good, or when two or three cavities occurred which he had filled, the fillings had remained perfect for fourteen years, showing that these teeth with faultily formed tissue could be depended upon to stand, and even to retain fillings in case their environment was good.

Such cases of soft tissue in teeth are certainly exceedingly rare. I have been in position to make very wide observation of teeth, and while much faulty formation of enamel has come to my notice, and also much imperfect dentin, these imperfections are strictly localized. I have observed but two cases of soft tissue general to the teeth in all of my experience. One of these presented in the Infirmary of the Northwestern University Dental School last winter. The patient was Mr. L. D. Price, 1006 Garfield avenue, Chicago. I was called to the case on account of the very singular appearance of the teeth. I found them of an opaque white, much like ordinary white paper. They looked as if they had been subjected to the action of an acid. The surfaces of all of the teeth were alike all over, extending even to portions of the enamel covered by the gingivæ. There were thirty-two teeth in the mouth. The gentleman was twenty-seven years old, and said his teeth had always presented that appearance, and had often attracted attention. He had never applied to a dentist before, having no need to do so, but lately had noticed a cavity in one of the bicuspids. There were very few decays in the teeth, two approximal cavities in bicuspids only. The enamel was mostly worn away from the occlusal surfaces, exposing the dentin. This enamel I could cut readily in any direction, certainly as easily as I could cut an ordinary slate-pencil. The dentin seemed to be normal in consistence.

Here was a case in which the enamel covering the teeth was so faulty in its formation that it would seem to invite the early and complete destruction of the teeth, but caries seems not to have occurred at all until maturity, and much less than usual even then.

Another failure in the formation of the tissues of the teeth was presented to me some years ago: a child who had the incisors and two of the molars (deciduous teeth) in position. None of the teeth had any trace of enamel, and the dentin was so soft that it would bend about in any direction when the child tried to use the teeth, and caused it severe pain. I found that I could pass a sharp exploring instrument through them in every direction the same as through the soft tissues. Otherwise the child seemed healthy.

Such cases, together with those reported by Dr. Bogue, can be regarded only as rare monstrosities in the formation of the tissues of the teeth. They furnish no ground for the supposition that teeth normally formed vary considerably in density.

Dr. S. B. Palmer's paper is a very curious piece of writing. He says, page 791, "There are facts recorded in the tables emanating from physical investigation so carefully prepared and systematically arranged that they are under the seal of science, and challenge refutation;" and upon the same page he also says, "So far as the difference exists relating to the teeth which we present, science, from the physical plane, is *misapplied*," and says that "the investigations which we are called upon to refute are of the *earth earthy;*" and again on page 790, "We will now take our stand upon the animal plane where man 'lives and moves and has his being,' which is quite above the plane upon which the conclusions under discussion were based." From this it will be seen that while Dr. Palmer acknowledges the correctness of the findings as being upon what he calls the physical plane, he regards them of no consequence because he works upon the animal plane, which is higher.

Still he objects to the conclusion that there is no basis for the selection and adaptation of filling-materials to soft teeth, hard teeth, frail teeth, or poorly calcified teeth, for the reason that all are found to be sufficiently hard, and says, "We know that teeth undergo changes from the time of their first calcareous deposit until the pulp, from natural limitation, or from caries, or from accident, fails to perform its function." "We know that teeth at twelve years of age have not reached the limit of pulp-nourishment."

An examination of the tables I have presented proves that there is a constant increase in the proportion of lime-salts from youth to old age, and Dr. Palmer ought not to represent, as he does in these sentences, that I have denied pulp-nourishment under any normal condition of the tooth, much less asserted that it ceased after the age of twelve. Proceeding directly from the last quotation, Dr. Palmer says, "We know that young teeth are softer than the same would be at maturity; also that some are free from caries and others are badly decayed at twelve or fourteen years. We know that it is under a natural law that the latter decay when filled with gold without some insulating lining, for the following reasons: the fact that decay has attacked several teeth is an evidence that their structure is faulty." "We know that dentin is a conductor when in this condition." Dr. Palmer thus prepares the ground for the presentation of the electric theory of caries, and of the selection and adaptation of filling-materials to soft teeth, and to hard teeth, or to teeth not well calcified. The tables which I have presented seem not to have given enough variation in lime-salts to work his electric currents properly. He therefore escapes from the physical plane which is "of the earth earthy," and rises to a higher plane, and proceeds without disturbance from the facts found to exist in the plane below. The doctor's papers are always interesting, even though we cannot all agree with his findings.

Drs. Maxfield and Andrews admit the main contention regarding the variation of lime-salts in the teeth, and immediately set up the theory that it is the *condition* of the organic matrix that gives liability to caries or protects from that liability; but they do not seem to agree as to the manner of the manifestation of this influence.

Mr. Tomes thinks that while the proportion of lime-salts may not be different in different teeth, there may be a difference in the relative proportion of the carbonates and phosphates, or that there may be a difference in the constitution of the phosphates themselves. All of these seem to be suppositions that have no basis of scientific experiments or direct clinical observations, further than that we have been in the habit of attributing the differences in the liability of the teeth to caries to differences in the teeth themselves; and since it is not to be found in differences in the amount of lime-salts, as had been supposed, it must be something else. It is indeed difficult for the human mind to escape the influence of long-cherished hypotheses. I can appreciate this from similar difficulties of my own.

Dr. Truman thinks that I may have reported truly on the teeth in hand, but that the right teeth were not obtained; for he says, page 797, "If, on the other hand, teeth had been selected from a mouth recognized as having chalky teeth, and these be compared with the aforementioned, and the results had been the same, it would not have been possible to have offered any criticisms, for even personal observations must give way to the crucible of analysis."

No other person, to my knowledge, has resorted to such an argument as this. It amounts to a simple denial that I did the thing that I took especial pains to do, and so expressed. Furthermore, I did it on precisely the lines laid down by Dr. Truman himself, when he says, page 798, "It has been the observation from time immemorial that teeth do decay in proportion to the so-called density of their tissue. It has been universally recognized that teeth of soft structure yield to environment with a rapidity that defies the best work of the most skillful dentist, while, on the other hand, the teeth regarded as dense resist to a great extent the effect of surroundings and give way slowly to destructive influences; oftentimes resisting to the extent of causing a cessation of caries. The reason for this latter result can be explained only theoretically on the fact that some teeth are more dense than others." On page 358, COSMOS, May, 1895, under the head of "Collection of Material," it will be found that capable dentists who assisted me, and who are named on page 366, were instructed to give the "nativity, age, state of the general health, *to class the teeth as bad, fair or good, as to occurrence and rapidity of caries*, record the conditions of the gums, etc.," thus fulfilling to the letter the requirements Dr. Truman would impose, and which he sees fit to ignore, both in this article and the one previously written by him. I might ask also what Dr. Truman would do with Mr. Charles S. Tomes's check experiments, of which he must have known before this last article was written.

Then, again, Dr. Truman denies his own statement, seemingly, when he says, page 798, "Caries is not confined to teeth of poor structure; indeed, it may be said with some degree of truth that this is no indication at all of the character or even the extent of the destruction." I submit that the doctor should guard his statements better than this, as well as some others which will be noted later.

On another page, 799, he further states, "If Dr. Black's conclusions are to be accepted, then it is certain that other factors besides the amount of lime-salts have an important bearing upon their [the teeth] resisting power. What these are have not been determined, and until this is known we can safely leave the question where it has remained in practice; that there is a vital difference in teeth, and that caries is largely dependent on structure."

I submit that these quotations show, first, that the gentleman denies the fact, and then, in effect, says if it be the fact it is not true. In this connection I may be pardoned if I call attention to the fact that I have stated explicitly that it has been the opinion of the profession that differences in the physical characters of the teeth were controlling factors in their liability to decay, and have presented proofs controverting this opinion. Therefore, the reiteration of this opinion which is so freely indulged in, especially by Drs. Truman and Palmer, does not constitute an argument. It devolves upon them to present substantial proofs of its correctness, which they have not done.

Dr. Truman then runs off on a wild chase after Leptothrix buccalis in an effort to controvert jointly Dr. Williams's paper and my own. Leptothrix threads of the different varieties are found plentifully about the superficial portions of carious dentin, and clinging in and upon gelatinous microbic plaques upon the teeth. By some of the earlier observers who wrote before plans for the separation and differentiation of species of micro-organisms had been made out, these were regarded as standing in a causative relation to caries of the teeth. But by Miller and other recent observers they have not been found in the deeper portions of carious dentin. They have, therefore, long ago been dropped out of consideration as caries-producing fungi. It is fungi of a different sort that are the active agent in the production of caries, as has been so well shown by Dr. Miller, of Berlin, and others. When Dr. Williams showed his pictures on the screen I did not suppose that it was necessary to especially point out that these acid-producing organisms were present, for the familiar forms were sufficient evidence. If there was any fact demonstrated and pointed out by Dr. Miller, it was that these micro-organisms found deep in carious dentin in each and every actively progressing carious cavity examined are actively acid-producing. Since that time no class has gone out from my teaching without this fact having been demonstrated to them, both in the lecture-room and by culture experiments in the laboratory, showing the development of the acid. The fact of this acid-production is well and widely known, and when Dr. Williams showed the presence of these organisms in the gelatinous microbic plaques upon the teeth, together with the effects upon the enamel beneath, it was not incumbent upon him or any one else to prove again that these were acid-producing organisms, and that they furnished the acid which caused the chemical disintegration which was apparent.

Further, it would seem unnecessary to point out that the disintegration begins on the outer surface of the enamel, and that the one thing necessary to the beginning of caries is the formation of such a gelatinous microbic plaque in a secluded position where its acids may act without too frequent disturbance, as in pits, fissures, approximal surfaces, about the margins of the gums, etc., and there give rise to caries. It seems to me too late for any one to argue that caries of the teeth is caused by acids freely dissolved in the saliva. If this were true the strict localization of the beginnings of caries, which has been so long noted, and the positions classified by most teachers, would not occur. This strict localization of caries shows conclusively that some power isolates the active cause and confines it to these specific points of its action. Nothing has yet been shown that explains this so explicitly and satisfactorily as the formation of the gelatinous microbic plaques demonstrated in position by Dr. Williams. What condition of the tissues of the tooth will resist the effect of this acid held against the enamel? Would a superabundance of lime-salts cause it to resist? Is there anything possible in the characters of the basis-substance, as argued by Dr. Maxfield, that would cause it to resist? Is there anything possible in the special proportions of the carbonates and phosphates, or in the chemical structure of the phosphates, as suggested by Mr. Tomes, that would cause it to resist? Is there anything in the vital endowment of the teeth, as argued by Dr. Andrews, that would cause it to resist, and does the influence of this vital endowment stand out in sharp distinction in teeth with living pulps, as compared with teeth with dead pulps? Dr. Maxfield says, page 810, "Clinical observation also demonstrates that pulpless teeth are less liable to caries than teeth in the same mouth containing living pulps, and when caries begins the progress is much slower." Is it possible, then, that the influence of vitality is to invite the beginning of caries and to favor its progress?

The opinion of Dr. Andrews would seem to be different from this, for he says, page 786, "The organic structure may not have the strength in middle life that it has in youth, as has been shown by Dr. Black's experiments, but the vital power given to its organic structure by reason of robust health may be much greater, and as a result we find the organic structure fortified with this vital force so that it will be found resisting the inroads of the destroying organisms to a very great degree." It will be seen that this view is directly opposed to that given by Dr. Maxfield.

My own clinical observation is that teeth with living and teeth with dead pulps are about equally liable to caries, but that caries progresses more rapidly in pulpless teeth. In cases in which caries has been making rapid progress, and afterward diminishes or ceases in a mouth in which there are pulpless teeth, do not the pulpless teeth become less liable to attack the same as those with living pulps? I have made many inquiries of dentists of experience upon these points regarding pulpless teeth as compared with teeth with living pulps, and while I find a variety of opinion derived from clinical observation, the consensus of opinion would indicate that pulpless teeth follow about the same lines of increased or diminished liability to caries as their fellows with living pulps. Is this increased or diminished liability of pulpless teeth to caries brought about by vital changes in the teeth themselves, or changes in the condition of the tissues of the teeth? Surely the gentlemen have been giving their opinions without sufficient thought. This subject is not so well understood that we may explain it upon a page, and harmonize all contradictory clinical appearances. Things are not always what they seem to be at first sight. There seems to be much confusion in regard to the phrase, "liability of the teeth to decay." I have said that pits, grooves, and faulty points in enamel give *opportunity* for decay, using this term instead of "render the teeth *liable* to decay," because this latter seems to be misleading by indicating that these conditions may be, in a sense, a cause of decay. The cause of decay of a tooth is a solvent of its lime-salts, an acid elaborated by micro-organisms. This agent will act only when presented in the required degree of concentration. Then it will act upon any tooth-tissue, but will act more rapidly on imperfect tooth-tissue which presents openings, imperfect cementing of enamel-prisms, interprismatic spaces in enamel, or interglobular spaces in dentin; conditions that are of frequent occurrence, and which allow the active agent to enter the tissue more freely than when the tissues are normal.

I believe I have had the good fortune to have found some facts, and that Dr. Williams has found other facts, that will serve, as they become better understood, to correct some of the errors of the past. But they by no means serve to clear up the difficulties surrounding this subject of caries of the teeth. Indeed, they only show that we had taken the wrong road, and that we must go back and try again. As to this trial I gave some suggestions in the closing paragraphs of my paper that seemed to me to be along the lines of greatest probability of future development of thought. These were not made hurriedly, nor unthoughtedly, but after much careful study. I was careful to give only the findings of other bacteriologists, and direct attention to their possible bearing upon this subject, without specializing the particular points that were in my mind as to their application. Then came Dr. Williams's report of his great effort along a line similar to my own, and he placed upon the screen the gelatinous microbic plaques that I had been trying, unsuccessfully, to place in clear light. To show this I may quote a single sentence from the Transactions of the Illinois State Dental Society of 1886, page 203. I was at the time cultivating the micro-organisms of the mouth, and especially the caries fungus, before the society, demonstrating its acid-forming power, and, so far as I then knew, trying to explain and show its disposition to form gelatinous microbic plaques upon the teeth. "It has no power of itself to penetrate enamel or dentin, and the acid must precede it continually, as we find by observation it does. Growing against the side of a tooth it will often form this gelatin and protect itself from removal until it works its way through, and it crowds itself into the tubules and fills every available space as it goes."

This is sufficient to show that the existence of the gelatinous microbic plaques shown by Dr. Williams was not new to me, and also to explain my great delight with his presentation. I had been unable to demonstrate them in position, with the effects of the acid formation upon the enamel beneath, in any such manner as it was shown by Dr. Williams; but I had the formation of these gelatinous microbic plaques distinctly in view when I wrote the suggestions contained in the notes of the defensive proteids, page 420 of my article of May, 1895, though I had not sufficiently the confidence of my own convictions to place them in the foreground. That which has special application here is introduced in these words: "The second class (of defensive proteids) are those that, while permitting bacteria to grow, prevent the formation of, or modify their toxic products, and are called attenuating proteids." Up to that time I had repeatedly found this gelatin formed in my cultures; but as often it was not formed, the difference seeming to depend upon something in the constitution of my culture-media that constantly eluded me, yet something that caused the abundant formation of the gelatin in the one medium and prevented it in another, the organisms growing well in both. Later I have become able to so manipulate the culture-medium as to cause the gelatin to be formed or not formed at will, and by hardening in formalin have been able to cut sections of it; but the means used very much diminish the growth, and cannot be akin to the changes taking place in the oral fluids, yet the study of the plaques upon the teeth is showing conclusively that this is the factor controlling the beginning of caries. In the mouths of persons immune from caries the same micro-organisms grow, but in their growth form no gelatinous microbic plaques, nor gelatinous masses. The same acids are formed, but they are distributed freely in the saliva, and no caries results. In these cases the saliva may show continuous acidity for years, yet caries does not occur. In cases in which decay is rapidly progressing it is not difficult to demonstrate the presence of these gelatinous microbic plaques upon the teeth. By careful manipulation we may remove them, prepare them by staining, and mount them for microscopic study. In this the difference is evidently to be found in the constitution of the oral fluids, not in hindering or favoring the growth of the micro-organisms, or the formation of acids by them, but in hindering or favoring the formation of the gelatinous microbic plaques which renders the acid formed ineffective or effective in producing caries, or preventing this result. This much is now foreshadowed, but not so perfectly unfolded by scientific demonstration that satisfactory exhibits can be made in artificial cultures, much less to arrive at the factor or factors controlling the different results in the human mouth.

# CONTOUR SLIP MATRICES.*

BY J. F. P. HODSON, D.D.S., NEW YORK, N. Y.

MATRICES have heretofore been valueless to me in my practice, for the following reasons: First, and most important, being but a straight band around the tooth, the swell or contour obtains but in *one* direction, leaving the other (the perpendicular face) quite as innocent of contour as though a separating file had made the space, a very widely differing condition from the "oranging" contact of the ideal approximal surfaces.

Second. In case of the slightest depression in the cervical face of the tooth banded, the very act of drawing the band tight leaves this space bridged across and so wide open from the interior, and a consequent woful cervical condition of the produced filling,—either to finish or to leave.

Third. This same drawing of the band tight pulls it quite away from the contiguous tooth's face, and, unless the teeth have been previously wedged apart, destroys all proper impingement and leaves a permanent parallel space exactly equivalent to the most ancient ones made by straight separating files.

Fourth. The whole apparatus, steel band and clamp, or screw device for drawing tight, is large and cumbersome, and must of necessity be removed before the patient leaves the chair, and (again unless a considerable wedged space has been made) making it impossible to remove without destroying the very contour it was presumably applied to produce.

The simple and delicate, but very powerful, little slip matrix herewith presented has in my experience wholly obviated all of these objections, and has become one of my most cherished daily assistants in the treatment of morso-approximal cavities. They were conceived originally for the plastics, in which case they are *left in place over night* (the plastics thus setting under pressure), slipping out easily the next day away from the then hardened and perfectly contoured surface of the filling.

They are most easily made, even for each case, though in practice this is not necessary, as they may be employed over and over again, as follows: Suitable-shaped pieces, of a size to a little more than overlap the cavity margins, are cut from thin annealed steel (I have happened upon exactly the required sort in that which is employed in stiffening the bottom of ladies' dresses), all corners and burred edges smoothly finished; then a tiny hole punched close to the middle of both the buccal and lingual edges, and it is then laid upon a piece of lead and *swaged* (not merely bent, be it remarked) into perfect concavity, greater or less as the individual case shall require, by tapping with a hammer a convex end of hardened steel laid upon it; my own instrument being a round-headed picture nail, case-hardened, polished, and with twisted wire attached at right angles to a handle (Fig. 1). Any amount or shape of concavity required for each case can be thus produced in a moment, either newly from blanks kept ready or changes made in those used for other cases to fit the one in hand, about a dozen of different sizes and degree of convexity being sufficient to select from, with little or no change for all ordinary cases. The tapping having restiffened the steel somewhat, taken in connection with the impingement of the convex face against the approximal surface of the adjoining tooth, gives firmness and strength to these delicate little strips and a perfect hugging fit to the surfaces of the tooth being filled, especially at its cervical margin, that is most satisfying.

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*Written at the request of the president and other members of the New York Odontological Society, in elaboration of the clinical demonstration of February 15, 1898.

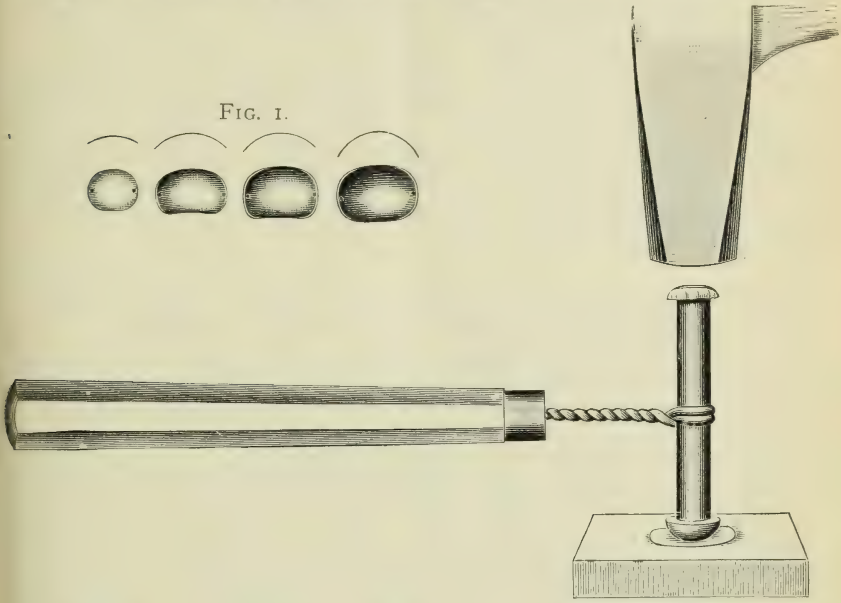
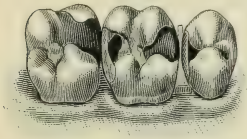


FIG. I.

All preliminary wedging of these side and back teeth has so become with me practically obsolete, the necessary finishing of approximal faces previous to filling, by passing a very thin ribbon saw between the teeth, and following this with the thinnest polishing strips, furnishing all the space required for the delicate thinness of these slips.

The perfect damming which these slips create against any moisture, short of the soaking from a flood of saliva, makes it really, on some occasions, a work of supererogation to use the rubber-dam at all; but however this may be in any particular case, all being in readiness, the slip is started in its space with the tweezers, and then carried smoothly home with a curving slide, by means of a large flat-end plugger placed on its top edge. If it be found that it catches on the cervical edge of the cavity, place a large pointed plugger against that point from inside the cavity and gently pry the edge outward at the same instant as pressing on the top edge, when, upon passing the obstruction, it will be found to fit the contour and edges like a glove *and impinge against the adjoining tooth at the same time.*

FIG. 2.



If the "knuckle" be (as is usual) near the center of the approximal surface, it will be found to be perfectly resistive at all margins to any filling pressure. If, however, the teeth be long and the "knuckle" nearer the morsal surface, the cervical edge of the matrix will be apt to spring away under such filling pressure. A little wooden wedge between the teeth at that point will entirely obviate such difficulty. Fig. 2 shows the matrix adjusted.

The slips are removed immediately upon getting past the "knuckle," in the case of a gold filling, and completing the filling without them, or the next day, after filling with amalgam or other plastics, by placing two tiny excavator points in the holes on each side and drawing them out with the same curving motion as was made in placing them, and finishing the filling with thinnest strips in the usual way.

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## SURGICAL TREATMENT OF ALVEOLAR ABSCESS.

BY L. MEISBURGER, D.D.S., BUFFALO, N. Y.

(Read before the Eighth District Dental Society, Buffalo, N. Y., April 26, 1898.)

IN selecting a subject for your consideration, the thought foremost in my mind has been, what I might give you that would be of some practical value. Therefore, I have chosen for my topic something in "Oral Surgery," which seems at the present time the only permanent operation for the relief of chronic alveolar abscess.

I think I can say without fear of contradiction that dentists, as a whole in the past, have been somewhat fearful of undertaking any operation which was not of daily occurrence in their practice.

There are several factors which enter into the prognosis of a tooth and its surroundings which are affected by alveolar abscess.

*First.* The severity and character of the inflammatory action and septic invasion. In cases in which inflammatory action is localized, and presenting none or but little febrile disturbance, the prognosis is as a rule favorable, but a slight amount of tissue necrosis occurs.

*Second.* Should, on the other hand, the inflammatory action proceed with marked violence, it is possible that not only may the pericementum suffer extensively, but a considerable portion of the periosteum over the process may be raised from the bone during the escape of the pus.

Should this separation of the periosteum be maintained for more than a few hours, the underlying bone may suffer to the extent of necrosis. In case of marked lymphatic involvement, the neighboring glands being swollen and tender, or even the skin over them exhibiting evidences of glandular inflammation beneath, more or less septic intoxication will probably occur, and, unless the focus of infection be promptly sterilized, septicemia is to be feared.

*Treatment.*—The general treatment of alveolar abscess is that for the treatment of abscess in any part.

The details are of course modified in accordance with the anatomical peculiarities of the part to be acted upon. The principles are the removal of all dead matter, together with the active causes of the inflammation and suppuration,—that is, micro-organisms and their products,—and the induction of tissue regeneration, which shall restore parts lost through the formation of the abscess.

The instrumental means are the instruments employed to gain access to the focus of disease-action and those employed in the mechanical removal of dead parts.

*First.* The mechanical measures include the agents employed to wash out the abscess tract.

*Second.* Those applied to destroy the active causes of the suppuration.

*Third.* The remedies applied to induce new tissue-growth, and next, those employed to maintain asepsis until the healing process is complete.

In opening an abscess the surface should first be carefully cleansed, and other antiseptic precautions observed. By this I mean that all instruments should be antiseptically treated.

The first step, then, in our operation would be the cleansing of the surface with hydrogen dioxid, followed by a small injection of a five per cent. solution of eucain $\beta$; an incision is then made at a point on the gum immediately overlying the apex of the affected root, with a pointed bistoury thrust down to the bone,—a good-sized incision should be made. The bleeding is then encouraged by the use of hot water for a few minutes, when a pellet of cotton which has been dipped in a solution containing one or two per cent. of cocain and antipyrin four per cent. is then laid against the periosteum at the bottom of the cut. In a few minutes bleeding will cease, when a spear-drill driven by the engine is passed through the bone into the tissue of the apical space.

Any bleeding which may occur is encouraged as above mentioned. For washing incisions and the abscess in such cases there is no agent more acceptable than a twenty per cent. solution of phénol sodique, it being both sedative and antiseptic. A fair-sized round bur is then used to cut away necrosed bone if any is found.

If it is found necessary to excise the end of a root, a small fissure-bur is used, and the root rounded, leaving no rough edges.

The wound is now cauterized with a fifty per cent. solution of zinc chlorid, and the cavity loosely filled with boracic acid gauze, your patient being seen every day, and less gauze inserted at each dressing as granulation progresses.

The time required for healing is from four to ten days, according to existing conditions. An antiseptic mouth-wash should be recommended in addition to the above treatment.

Let me cite the case of a patient who was sent to me who had had an upper central incisor crowned some six or seven years previously; shortly after it had developed an abscess, which having remained all these years had become chronic. The patient would not think of being without a tooth. What could be done? One of two things: the taking off of the crown and insertion of an artificial denture, and consequent treatment along old lines with doubtful results; or the removal of the crown, canal antiseptically treated, end of root carefully filled, and another crown immediately put on, and abscess treated as advocated by this paper.

I report this case, as it shows where this method can be applied with gratifying results to both patient and operator. I have taken it for granted that the canals of teeth treated in this manner have previously been treated and thoroughly filled.

In conclusion let me say, then, that this operation is a very simple one, remembering that cleanliness is one of the first principles to be observed, a little care when operating on the anterior teeth so as not to penetrate the floor of the nose nor the antrum of Highmore over cuspid or back teeth. This you can avoid by measuring your root approximately. If by accident you do penetrate these spaces, keep them antiseptically clean by using boracic gauze, and you need apprehend no further trouble.

I have spoken of thoroughly filling and treating the canals of teeth operated upon in this way, for, if this is not done, and your operation fails, you will consider your operation a failure, when in fact your preparatory work was carelessly done instead.

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## CONTAGIOUS PHAGEDENIC GINGIVITIS.

BY J. FALERO, D.D.S., CITY OF MEXICO.

(Read before the "Pedro Escobedo" Medical Society, City of Mexico, Mexico.)

AMONG the different diseases to which the gums are exposed, that which forms the subject of this paper deserves special mention, as much for the danger which sometimes accompanies it as for the slight attention given it by writers on dental pathology.

With the one exception of the Encyclopedic Dictionary of Medical Sciences, I have seen nothing worthy of mention relating to this subject. In the work alluded to the diseases of the gums are treated in a masterly and extensive manner under headings of the different classes of stomatitis, and especially the ulcerous. But unfortunately not even there can we find that for which we are seeking, which is a description of a variety of this disease which exists among us, and which, although it is not very prevalent, is nevertheless far from being unusual, and it is hardly possible to find a physician or dentist who has not had an opportunity of treating it in his practice.

Taking the character of the disease into account, as well as the locality in which it becomes developed, I take it upon myself to propose as its name "contagious phagedenic gingivitis."

The first manifestations which we notice of this disease are congestion of the gums and a separation of the gums from the teeth, accompanied by a characteristic fetid smell of the breath. This period lasts from twenty-four to forty-eight hours, after which a whitish ulcer forms on the papules, extending rapidly over all the gingival border, which it invades in twenty-four hours, more or less, commencing in the anterior part of the mouth, generally in the lower incisors, and extending toward the posterior part. When it has arrived at this state the gums bleed very easily, the pain becomes intense, and the fetor of the breath is almost insupportable even to the patient; the submaxillary glands become swollen, and, from inability to open the mouth, mastication is impossible. The patient suffers from constant ptyalism, as if he were under the influence of mercury; the saliva being thick, bloody, and fetid, and staining the pillow during the night.

Should the disease be not counteracted before it has attained its full development it destroys the whole of the gum, leaving the teeth uncovered, and exposing the alveolar process, in which case it is not rare that the destructive action does not cease until two or more teeth are lost, along with a more or less considerable portion of the alveolus. This acute period of the disease lasts only five or six days, after which it disappears gradually, but completely in from thirty to forty days. Such is the course of the malignant cases; the benign ones recover in much less time.

The state in which the gums remain after an attack of gingivitis is a piteous one; the fleshy part extending between the teeth disappears, the latter remaining more or less uncovered and painful.

The disease is contagious, attacking by preference those who are from twenty to forty-five years old; I have never had occasion to see a case at a greater age. Children are also subject to it, but all the cases which have come under my notice were clearly traceable to infection from relatives or attendants of the patient, due almost entirely to the bad habit of kissing the mouths of the children.

Smokers and those who drink alcohol to excess are more disposed to acquire this disease than others.

In the states bordering on the Gulf, as well as in the United States, this disease is so rare that it may be said to be unknown, while among us it is rather frequent. To what cause may we attribute it? Does the climate, the altitude, or the changes of temperature cause it? Has the food or drink, pulque for example, anything to do with it?

That the gingivitis of which we treat is of microbian origin is a fact of which we cannot doubt, being convinced of this both by the progress of the disease itself and the possibility of its transmission which we have been able to observe. The resolution of this problem will be demonstrated in the bacteriological study of the products of secretion which I hope to have the honor of presenting at some future time.

Although this disease at first sight may seem to confound itself with ulcerous stomatitis, it nevertheless differs from it in some points, the most notable among which are the following:

*First.* Ulcerous stomatitis is accompanied by febrile and gastro-intestinal symptoms, while the gingivitis of which we treat is not.

*Second.* Ulcerous stomatitis is met with principally in children affected with rachitis, or those who lack sufficient or proper food, or who live in damp or unhealthy dwellings, while gingivitis attacks preferably adults, and above all drunkards and smokers.

*Third.* Ulcerous stomatitis forms isolated ulcers on the gums and cheeks, and frequently attacks the edges of the tongue or vault of the palate, while gingivitis consists of a single ulcer, circumscribed to the gingival border of the gums.

*Fourth.* Stomatitis commences generally at the posterior molars, and is confined in most cases to one side of the mouth, while gingivitis commences in the anterior part in the region of the lower incisors, and extends on both sides.

*Fifth.* When stomatitis is cured it leaves no after-signs, as the gums reassume their original integrity, while in gingivitis the lost tissues are never reproduced.

*Sixth.* The teeth suffer but slightly in stomatitis, while they always remain uncovered and sensitive to cold water after an attack of gingivitis.

*Seventh.* Ulcerative stomatitis may be cured without removing the tartar from the teeth, while in gingivitis it is impossible, the removal of calcareous deposits being an indispensable condition.

From the above it may be deduced that though it is certain that this disease has many points in common with ulcerative stomatitis, it is nevertheless also certain that it presents certain characteristics which are entirely its own, requiring a distinct treatment, since the causes which produce it are distinct.

The treatment which I have made use of with good success in the cure of this disease is as follows:

Cleanse the teeth perfectly. This is difficult, on account of the sensitiveness of the gums. Immediately after disinfect the mouth with lukewarm solutions of lysol, salol, or carbolic acid, using a syringe with sufficient force to thoroughly wash the superficies of the ulcers. Order the patient to wash his mouth with a weak solution of carbolic acid and potassium chlorate, prohibiting the use of all irritating food, such as chilli, salt meats, alcohol, etc., confining the diet to milk, eggs, roast beef, and other non-irritating food.

It is also necessary to mention a factor of the greatest importance in the treatment of contagious phagedenic gingivitis,—the absolute necessity of prohibiting the use of tobacco, which is a real poison in this disease.

The ulcers are also cauterized with a solution of carbolic acid, fifty per cent., with silver nitrate, etc., until they disappear and the gums resume their normal state.

# PROCEEDINGS OF SOCIETIES.

## NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held at the New York Academy of Medicine, No. 17 West Forty-third street, on Tuesday evening, February 15, 1898, with the president, Dr. S. G. Perry, in the chair.

## REPORT OF THE CLINIC COMMITTEE.

Dr. HODSON. The clinic to-day was a most enjoyable one; that of Dr. Gaylord developing into an intensely interesting one over the preparation of the cavity operated upon, possessing the extraordinary quality as a clinic of having three so eminent operators as Dr. Gaylord, Dr. Perry, and Dr. Northrop actually engaged upon the one operation, with all the attendant discussion between these gentlemen, and with the onlooking members, the whole being a simultaneous "triple star rendering of the same part" entirely unique and of infinite practical value.

The actual filling in which Dr. Gaylord was to have demonstrated the points which he proposed for his clinic was, through a misunderstanding, of such nature that he could not well apply them; which we are not altogether sorry for, as this will, we hope, insure his being before us again later.

Between times Dr. Hodson demonstrated to individual members the making and application of his contour slip matrices, consisting of an exceedingly thin slip of steel swaged into full contour, and curved into perfect snug fitting between the teeth.*

## INCIDENTS OF OFFICE PRACTICE.

Dr. JOHN I. HART. I present models taken from the mouth of a patient about twenty-seven years old, who suffered when she was five years old with scarlet fever, and immediately upon her recovery from that with measles. This so affected the enamel-organ of the incisors and cuspids that the result is interesting, and I will pass the models around for the consideration of the members.

I would also like to present an exostosed first molar; the exostosis is very marked, and is due entirely to lack of occlusion.

The paper of the evening was then read by Dr. L. DUNCAN BULKLEY, New York, the subject being "Manifestations of Syphilis in the Mouth."†

### *Discussion.*

Dr. D. BRYSON DELAVAN. The reader of the paper has already gone into the matter so exhaustively, and in such a clear and convincing way, that comparatively little remains to be said. It is a pleasure, however, to corroborate the statements which he has made.

The bringing before you of this subject to-night is particularly timely, because, say what we may of the benignity of syphilis at the present day, about the ease with which it can be cured, and the comparatively improved state of our knowledge concerning it as contrasted with the state of things some years ago, syphilis can never be regarded as other than a very serious disease, and one not easy to handle. Its prevalence is perhaps greater than some would appreciate.

As is well known, it may occur in any class of practice. The dentist having patients of the best character, of the best social position, is not by any means exempt from discovering it among them,—acquired innocently, perhaps, and yet the same disease nevertheless in every case.

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*For detailed report, see page 452 of the current number.

†For the paper in full, see page 431 of the current number.

I therefore concur most heartily with the last recommendation of the reader of the paper, namely, that it is the duty of the physician to inform the dentist to whom he may recommend his syphilitic patient of the fact that the patient is so affected. It is a very common thing to send a patient with secondary syphilis to the dentist, on account of the special needs which exist at that period of the disease.

Syphilis of the mouth, in the early secondary stages, is a virulently infectious disease. The infectiousness of the mucous patch, and the ease with which the disease can be transmitted at this time, of course are well known to be particularly great.

There is no question that the mouth is a very vulnerable point for the introduction of the syphilitic poison, as will appear when the number of cases is remembered in which chancre has occurred upon the lip, or upon some part of the buccal cavity. The teeth are especially liable to need attention, and it is also true that not only should the dentist be put on his guard, as Dr. Bulkley has said, but he should exercise the most extreme precautions, not only for his own safety, but for the safety of his patients. As to the diagnosis of these cases, a well-developed mucous patch should be easily recognized by every practitioner. In some instances, however, the diagnosis is difficult, and it can only be established by careful study of the progress of the lesion. The most difficult cases to deal with in the experience of the speaker had been those in which the throat symptoms had not advanced sufficiently to suggest what the real trouble was.

In no department of surgery is the practice of thorough antisepticism more necessary than in this; and while I am well aware of the care that is taken in this particular by all good men, I think we cannot, any of us, have our attention called too often or too earnestly to the great importance of the observance of it.

The least that we can do to secure the safety of the innocent is to make it an invariable rule never to use upon a healthy patient an instrument that has been applied to a syphilitic one. This can easily be accomplished by keeping a special set of instruments for the latter class of cases.

Dr. WALTER F. CHAPPELL. I can only reiterate what Dr. Delavan has said, that Dr. Bulkley has so thoroughly covered this subject that there is very little any of us can add, especially to a body of men so trained in the handling of instruments and the care of the mouth, that it would seem almost absurd to attempt to suggest anything to them in the way of cleanliness.

I can possibly add a few personal observations of syphilis of the mouth which I have met. It seems to me that during the primary infection the cases rarely come to the dentist. Dr. Bulkley has been very fortunate in seeing so many cases of primary infection; I do not know of any one in this country who has seen as many.

At the Manhattan Eye and Throat Hospital, during the twelve years I have been connected with the institution, there are only two cases on record of primary syphilis, one of the tonsil and one of the tongue. This covers the examination of some twenty-eight thousand cases that have presented themselves at the institution for examination of the throat. In private practice, during ten years, I have seen only five cases of primary chancre of the mouth. Two of these I have already reported, and the other three are of no special interest, although one of them might be, as showing the mistake that physicians may readily make with this disease. The case had been diagnosed as one of diphtheria, and I have in my possession a certificate from the Board of Health of a New Jersey town, stating that this gentleman had Klebs-Loeffler bacilli in his throat, and that he was undoubtedly suffering from diphtheria. He was treated for about two weeks, gradually getting worse. He came under my observation later. He was anxious to have a diagnosis made, and denied any possible knowledge of acquiring syphilis. I examined his throat, and found the tonsil covered with a thin film of whitish appearance, a great deal of irritation around the tonsil, and cervical adenitis of the same side. By exclusion I made a diagnosis of chancre, and gave him suitable treatment, to which he responded at once.

Showing the possible infectiousness of the teeth, a case came under my observation last summer, in which a young gentleman of this city, while passing down Broadway late at night, was surrounded by several men; he foolishly struck one of them in the mouth and knocked a tooth out. The knuckle of his index finger bled considerably. He had his physician see it, and it was dressed antiseptically. When the dressing was taken off after a few days, the wound did not look well. About a week or ten days later it began to swell and look blue, and turned out to be a true chancre. In this case it seemed that the contact must have been entirely through the mucus on the tooth.

Regarding the secondary stage of syphilis, we all recognize that its manifestations are very numerous. Patients very often go to the dentist without saying anything about any trouble with their tongue or mouth. I think it is quite possible that many persons are not aware of the condition of the mouth, as some syphilitic manifestations are very painless, and in some parts of the mouth are not readily observed by a patient. It seems to me that a dentist, in addition to being cleanly, should be sufficiently experienced in the manifestations of the various stages of syphilis to determine their presence.

In the tertiary stage, as Dr. Bulkley says, it is difficult to make a diagnosis, especially in some of the late manifestations which occur in congenital syphilis. I have seen two cases recently of syphilis of the mouth, in which the diagnosis was made in one of lupus, and in the other of tuberculosis.

I do not know that I can add anything further to what Dr. Bulkley has said about the necessity of doctors telling the dentists regarding patients who have syphilis. I have several times had occasion to send patients with syphilis to dentists, and have always felt it my duty to inform the dentist of the presence of the disease.

Dr. EMIL MAYER. That the manifestations of specific disease are of special interest to the dental surgeon becomes very apparent when we consider the great frequency with which these diseases occur, and when we consider that the diseases are no respecters of persons,—age, sex, or condition having nothing to do with it.

These diseases from their very nature become hidden, and the patient who knows that the condition exists will refuse to tell, so that it becomes necessary for every one to be on his guard in regard to the possibility of causing a great deal of unhappiness to some innocent person. There is no question but that every practicing physician could tell of cases that have occurred in his own practice, where the disease has made persons unhappy for life.

The main point at issue is, how much or how little shall you be able to recognize the existence of a disease of this kind; and, when recognized, what steps shall you take for the protection of yourselves and your patients?

In the recognition of these conditions, you have heard so great an authority as Dr. Bulkley say that a student of the condition oftentimes becomes perplexed. How much more so shall one who sees cases only occasionally become so?

We can only say that ulcerated diseases of the mouth, speaking generally, should be looked upon as suspicious, to say the least. If they have not been referred to a proper authority for opinion they should be, and it seems to me that right here is the proper place to suggest that a great deal of care should be used in making a diagnosis before the patient. To illustrate this, I would call your attention to an incident that occurred a few days ago in my practice. A boy, aged eleven, was brought to me by his father. I had never seen him before. An examination showed that half the soft palate was destroyed. I called a couple of the gentlemen of the class, and remarked to them that this was undoubtedly a case of specific disease. The father was quite an intelligent man, and I told him this seemed to be a blood-disease. The father said he did not understand it, and that the boy had been treated for tonsillitis. A few minutes afterward the father came back again and asked if he might speak to me; he said he wished to say what he had omitted in the first answer to my remarks (which came to him entirely unawares), that a daughter of his had been under the care of Dr. Morrow for hereditary syphilis. This indicated that I was correct in my original diagnosis, and that the man at first had attempted to hide it.

I would say, then, in conclusion, that because these conditions are oftentimes kept from us, it behooves us to be especially careful in the statements that we make in regard to trouble of this kind, so that unless I were absolutely satisfied I should hesitate to express an opinion, and would merely say that the condition existing in the mouth is one that would preclude attention to the teeth until the former had been attended to. This holds good of almost any ulcerated or destructive disease of the mouth.

One point brought out recently is, how well can you destroy, by means of the methods used nowadays in asepsis, the germ or the poison of syphilitic disease?

Some very excellent authorities maintain that it is impossible to destroy it by the most powerful acids and boiling in alkaline solutions. If these authorities are correct,—and they seem to be very prominent men, notably among the French writers,—it becomes absolutely necessary, in the handling of specific cases, to have instruments separate and apart from those used in other cases, and these instruments should go through a greater degree of heat than most would give; in that way you are adding to the protection of the patient and of yourself.

Dr. CLARENCE C. RICE. I am sorry not to have heard some of the dental surgeons discuss this subject before I spoke. I regret, too, that I did not hear all of Dr. Bulkley's paper. I think it is pretty safe ground to believe that almost any large ulcerative condition of the mouth is *specific*, without going into fine points as to differential diagnosis. Certainly this standpoint is reasonable, so far as it pertains to the care we should take of our instruments and our hands. It is wise to be just as antiseptic in our methods, whether the disease is a glossitis caused by smoking or a syphilitic ulceration of the mouth.

I myself have seen but two cases of primary chancre of the mouth, one of these on the lip and the other on the tonsil. I remember long ago speaking with Dr. Bulkley on this subject, and was surprised to learn that he had seen so many. I was sorry not to have heard the part of his paper which referred to this, and the characteristic points whereby the diagnosis was made.

Usually we can easily diagnose primary chancre of the lip, or of the penis, but it seems to me that chancre on the tonsil, a soft, pulpy tissue, must be recognized only with considerable difficulty, which is increased after the tonsil has been affected by numerous inflammatory attacks, and the pillars of the pharynx grown over or into the tonsil. We can understand how a mucous patch or secondary ulceration on the tonsil might be mistaken for a primary sore.

But I do not think that throat men—so-called—see anything like the number of cases of syphilis that dermatologists do. When the primary sore appears they go to Dr. Bulkley, and as a rule he has cured them before they have time to come to us.

While it is necessary to caution everybody about the cleanliness of hands and instruments, and the danger of inoculating patients with instruments, I do not believe that so many patients obtain syphilis in this way as is commonly supposed. I find that in nearly every case, if it is studied carefully, it has been gotten in the way that it is usually obtained, and I do not believe that the dentist communicates syphilis in any wholesale, broadcast way.

I have been pleased with the kind of work which dentists (the ones I know) perform. In their methods of work I have always been impressed with their cleanliness, with the way they handle patients and disinfect instruments.

I should say that dentists compare very favorably with physicians in the care of their instruments, and in the antiseptic methods employed in the mouth.

It is not necessary to describe the different forms of syphilis of the mouth, or the differential points of diagnosis. This has been ably done by Dr. Bulkley. It seems to me, as I have said before, that the presence of ulcerations about the lips and the tonsils is sufficient, and that it is enough for us to use all cleanliness and every possible precaution with instruments.

The propriety of telling some patients that they have syphilis, and the best manner of telling them, is a topic which might be discussed with profit. I used to believe that there were physicians who were too fond of telling people they had syphilis, and I yet believe that there are doubtful cases where it is unjustifiable to suggest syphilis, and where the patient could be given mercury and iodid of potash without being told. There are some people who are tremendously depressed by such knowledge. I know of two or three cases of suicide resulting from such communication, and of other lives that have been wrecked by the knowledge that they had what they supposed was an incurable disease.

In our practice we are delighted to find that an ulceration is syphilitic rather than tubercular or any malignant form, because we consider syphilis in its early stages very amenable to treatment. I do not know that I can add anything to the antiseptic methods of precaution in the proper care of the mouth. I suppose that up-to-date dental surgeons are thoroughly equipped with all proper disinfectants, and that they are doing everything possible to prevent septic inoculation.

The President. I am rather tempted to confirm Dr. Rice in the statement as to the possible injury which may be done to the patient from the knowledge that he has a specific disease. I am reminded of a young man, a patient of mine, who recently left college; he came to me after a period of perhaps six months' absence, for his usual examination, and I found a marked change in the young man,—a startling change,—and I was at a loss to account for the condition. Just as I was about to examine his mouth, he said to me in a low and confidential tone of voice that he felt it his duty to make known to me the fact that he had acquired syphilis since I saw him. I had had the care of him for many years,—since he was a boy,—and as he announced that fact he broke down and manifested very deep feeling; he said that it had simply wrecked his life and broken up his whole future, and he did not want to live.

I felt at that time that if the physician could have kept from him the knowledge of his disease, and could have treated him without allowing him to know, it would have been better, because his appearance was so entirely different. He was pale and thin and care-worn, and depressed in every possible way.

I might mention, further, that he had been taking mercury for quite a long time, and it had left a very sad condition of the gums about the necks of the teeth. I asked him if he would not suggest to his physician that it might be wise to discontinue the use of mercury for a while. He came back a week after, saying the physician was quite content to discontinue the use of the mercury, and improvement in the appearance of the gums commenced immediately. In a month they were greatly improved, and since that time I have not seen him.

Dr. B. Lapowski. If a patient comes to a dentist with mucous spots, great care must be used. Suppose a patient comes without any manifestations, he must take the same care, because every secretion which comes from the mouth of a syphilitic man is infectious, no matter whether he has mucous patches or not; especially in the first few years, between the first and fifth, or first and fourth.

Now, as to instruments, a question was raised in the French Society of Dermatology and Syphilis, how long can an instrument keep the poison? Supposing the instrument is perfectly dry and not used, how long will the poison remain upon that instrument?

That question was not answered. Nobody present could give any personal experience, and I would be very glad if you gentlemen know something more about it. Those people who were asked were the best experts in France, and all answered that they could not give any information.

Nitrate of silver does not destroy the syphilitic infection. One gentleman cited the case of a surgeon who did not believe in it; he used nitrate of silver, which had been used in a syphilitic patient, and applied it to his sore finger. Several weeks after, a chancre appeared.

As Dr. Mayer remarked, we cannot destroy the syphilitic poisons. I entirely agree with him. Unless we destroy the instrument, we cannot destroy the germ. The opinion that we can destroy the syphilitic germ by boiling the instrument, or by application of even the strongest antiseptics, is only a theory, not supported by a single unquestionable fact, as we are unable to experiment with syphilis, because we neither know the nature of its germs nor can we inoculate it into animals, which prove refractory to this poison. In my opinion a dentist must never use the same instrument again, if he has used it once on a syphilitic man. There is no surety in any other way of not communicating the disease.

Dr. Wm. Carr. I believe that there is nothing in the domain of medicine or surgery outside of our own specialty with which the dentist should become more familiar than with the buccal manifestations of syphilis; not for the purpose of giving constitutional treatment, but to enable him to establish a correct diagnosis, and to guard against inoculation.

A patient was sent to me this spring, who had been accustomed to go to his home in Connecticut twice during the year for dental treatment. His teeth had just been put in order, but having an ulcerated mouth, he was sent to me for diagnosis. I told him that he was suffering from syphilis, which he, of course, denied. He had a wife and child. I advised him not to go home until he had consulted his family physician. He followed my advice, and returned the next day acknowledging that he had syphilis. He came to me again for treatment during the summer, having a fine chancre on his thumb. He had bitten a hang-nail, and this chancre was the result.

I was somewhat disappointed in Dr. Bulkley's paper, for the reason that he did not enter more fully into the proper care and treatment of the mouths of syphilitic patients prior to commencing constitutional treatment. From observation I have found that if, at first, all calcareous deposits are removed from the teeth, and the teeth are temporarily filled, these patients tolerate constitutional treatment better than if these operations are neglected.

I have been accustomed to use only old instruments in the treatment of syphilitic patients, and fearing that the usual antiseptic treatment would be insufficient, have afterward destroyed them in the furnace.

I know of three cases of primary chancre of the mouth being contracted by kissing.

I should like to ask a question. I am now treating a patient who has been under treatment for syphilis for two years, and who supposed that he was cured; he is now taking iodids, and has ulcerations of both tongue and mouth. Is this due to the disease, or is it due to the action of iodids upon latent mercury?

Dr. E. S. GAYLORD, New Haven. In thirty years' practice I have never seen a case. It has been my good fortune, and I appreciate it very much.

The PRESIDENT. I have heard that same remark made by many men—that to their knowledge they had not seen such cases.

Dr. J. F. P. HODSON. I have a question or two to ask. One thing suggested to me is, that most of us in these days are careful enough in our disinfecting, and in the application of all the usual methods of protection that would make us and the succeeding patients safe in that direction, but we would like to be able to know what in individual cases we are disinfecting against. We would like to have a differentiation made, and to be able to make our specific diagnosis of the condition before us,—for instance, as between a case with ordinary cold sores on the lips or aphthous patches in the mouth, and one of specific disease. Is differentiation possible, and can we make it?

We see aphthous sores every day. We see cold sores upon the corners of the mouth and upon the lips, and I may say, by the way, that as dentists we very seldom go on with these latter cases. Our operations are such that it is impracticable for us to do so, involving as it would the stretching of the lips and so opening the sores, to the great discomfort and pain of the patient, even under the most skillful touch; the operations under such circumstances being usually postponed to a later sitting. So we really come into little actual contact with sores on the lips. With mucous patches in the mouth it is wholly different, and in my opinion they point where real danger lies, and are something I would like to have differentiated from ordinary every-day aphthous conditions, to which we are accustomed to pay little or no attention.

Dr. Bulkley said that after the first symptoms of syphilis only constitutional symptoms supervened. This seems the most dangerous condition of all to my apprehension, because possibly unsuspected. What are these constitutional symptoms? Are we able to define them? Can they be made a helping for our quick local diagnosis? For myself, I have seen very few cases of syphilis in my practice. I place but two cases in all my professional experience of thirty-two years, and these were sent to me with notes from their physicians, stating the case and the facts.

Dr. W. St. George Elliott. To show the difficulty in recognizing constitutional symptoms, I cite the case of a gentleman known to all of you, particularly those of the older school, who for three years had softening of the brain. It affected his character in many ways. He was treated by many physicians. Finally, about ten years after, the experiment was tried of putting him under syphilitic treatment, and he rapidly recovered his health and lived for many years.

I would like to report a case that I had under my care in the East Indies. The patient was an Englishman; he had general destruction of the superior maxilla from necrosis, and after treating him for some time I found it necessary to remove the entire bone. He made a rapid recovery, and finally went some distance away, and I lost track of him.

Dr. B. C. Nash. A case presented recently where the patient supposed she had an ulcerated tooth, on account of soreness and the appearance of a white, elliptical patch on the gum. At the first glance I pronounced it a "canker sore," and cauterized it with nitrate of silver. The sore spot disappeared in a few days. In relating this incident, the point I wish to have brought out is what are the distinctive characteristics of the mucous patch that will enable us to positively distinguish between it and the canker sores which are so common in the mouth.

Dr. J. H. Meyer. I understand Dr. Bulkley, in his paper, states that among the most dangerous sources of infection are the rubber-dam, burs, files, etc. I wish to add one to that, the impression-cup. It has been my invariable rule, in teaching and in practice, to insist that this should be thoroughly sterilized after it has been in a patient's mouth.

Dr. A. R. Starr. In my experience I have seen very few cases of this kind in the mouth; and where I have met with such cases, I thought I was perfectly safe in sterilizing my instruments, boiling them, and in addition dipping them in alcohol, and burning off the alcohol. I thought that might be sufficient to destroy the germs or infectious material.

Dr. Cady. I believe that the average up-to-date dentist is just as capable of diagnosing syphilis as the average physician. I firmly believe that the great protection the public has against syphilitic infection from dentists' instruments is that the dentist is a cleanly being, and he takes great care that his instruments are clean.

There is not the slightest doubt that graduates from our best dental colleges are thoroughly competent men, and the dentists who are up to date now are medical men, and that whether they hold a degree of M.D. or not.

Dr. T. R. FRENCH. The communication of disease by means of hands or instruments is happily less of a possibility in these days of enlightenment and clean methods than ever before. Manifestations of syphilis in the mouth or fauces cannot always be seen in examinations such as dentists make. Patches may be located in folds and out of the line of direct vision, and a dependence upon a patient's admission of the existence of disease is not wise. An aseptic, if not an antiseptic, conscience is needed as much by the dental surgeon as the general surgeon. Skill conceded, the questions are asked more than ever before by those seeking the services of a dentist: Has he clean habits? Is the antiseptic care of his instruments and apparatus beyond question? The possession of such qualities protects not only the patient, but the dentist himself.

Dr. L. DUNCAN BULKLEY. In closing the discussion there is much which I should like to say to make the differential diagnosis more clear, but I find it much more difficult than I had anticipated; indeed, it is almost impossible to briefly state the clinical differences between all possible shades of syphilitic disease in the mouth and those of innocent character. This can be learned only by clinical experience.

I agree with Dr. Cady that the gentlemen present are probably very careful as to disinfection, and that it is not likely that they will be the means of communicating the disease, and in one sense I apologize for urging the matter so strongly upon you. But I trust if this discussion is printed it may be the means of influencing others, perhaps less careful, and thus prevent the catastrophe. I also agree with others that it is a marvel that more dentists do not acquire chancre on their fingers, which are so constantly in mouths, some of which are syphilitic. I have had over a dozen physicians under my care with chancre of the finger, which had become inoculated in the practice of their profession, but as yet no single dentist. I think it must be because of the inherent cleanliness of the dentists. There are, however, occasional cases where chancre in the mouth has been obtained, and constitutional syphilis acquired, through dental work, many of which are mentioned in my book on "Syphilis in the Innocent." I have seen at least one such case myself.

Some of the gentlemen have spoken about chancre of the tonsil. It is remarkable that I have seen so many cases, fifteen in all, but they are well authenticated. They all exhibited skin symptoms, and the infection was traced to the throat and no chancre existed in any other locality.

Dr. Chappell mentioned a case of infection from the teeth. I have seen several instances of this kind. One was in a college student, who received a scratch on the hand from his fellow's tooth, in a friendly wrestle. They had been warned of the danger, and had carefully kept apart until the particular time when the accident occurred. I have seen extra-genital chancres on almost every part of the body.

Dr. Mayer has made the remark that every ulcerative lesion should be looked upon as suspicious. But the mucous patches, from which infection comes, are not by any means always ulcerative. They may sometimes be very insignificant and innocent looking, simply slightly raised, reddened, or white patches, with tolerably sharply defined outlines, or often very indefinitely marked patches which may be the source of a poison which could communicate the disease. These are sometimes very difficult of recognition, and I have repeatedly known some of those well acquainted with syphilis uncertain as to the real nature of lesions in the mouth. When there is soreness in the mouth, unless its nature is very certain, I think the dentist should seek advice from the family physician, or one skilled in such diagnosis.

The president has made a remark which I must criticise. It was that it would have been better if the boy of whom he spoke had not been informed of the nature of his trouble. It might, possibly, have been better for him, for certain reasons, but it might have been worse for Dr. Perry, and I should have been sorry to have had to treat your distinguished president for a chancre of the finger acquired from the boy's mouth. The boy was right in telling of his disease and warning his dentist. While it may not be best for every one thus diseased to know that they have syphilis, they should know that in the early, infective period they should not expose others to the danger of acquiring the disease from them.

The PRESIDENT. I think I should have recognized in an instant the condition. And may I say one word in reference to the reason why dentists in operating do not acquire syphilis? I think they do not get their fingers into the mouth very much, and they are protected by the rubber-dam. The danger to the average surgeon is greater than it would be to the dentist.

Dr. BULKLEY. I am asked if it would not be well to have the teeth well attended to before the treatment for syphilis is begun. Yes, if it were possible to do this safely. But the nature of the disease is such that risks are run as soon as infection takes place. The occurrence of the well-developed chancre at the site of infection, which commonly occurs from ten to thirty days after exposure, is an indication that the system is already fully infected.

It may be better for the patient to have the teeth attended to before undergoing a mercurial treatment, but I am not willing to have my patients expose the dentist to infection at that time, certainly not without their having a warning and knowing the possibilities of infection through the mouth. I would rather the patient should suffer the results of delay in having dental work attended to, and cannot ordinarily feel justified in sending one to the dentist after the diagnosis of active syphilis is made.

I am asked by Dr. Hodson in regard to more definite differential diagnosis of the mouth-lesions of syphilis. Unfortunately this is sometimes very difficult, for they often so closely resemble innocent lesions in the mouth. The subject can only be learned clinically, and I am pleased with the remark of one of the gentlemen that dental students should be educated in medical matters; they should certainly be acquainted with syphilis, and made to know its mouth-lesions when they see them.

I do not quite agree with Dr. Lapowski in regard to the disinfection of instruments; if it were so, then the poison of syphilis could never be destroyed. There are many surgical instruments which have been used on syphilitic subjects which are cleansed only in the ordinary way, and contagion through surgery very rarely occurs, but few cases being on record. I think half an hour or an hour of active boiling in disinfecting solutions is surely sufficient. On the other hand, neglect to properly cleanse instruments has often operated very disastrously. Thus, some years ago there was a throat surgeon in Paris to whom no less than forty cases of chancre of the Eustachian tube were traced; from neglect of cleanliness he had transferred the poison from one patient to another in the operation of catheterizing the Eustachian tube.

The PRESIDENT. I am very sorry to have put any burden on you, in asking you to so thoroughly discuss such a question as this before this society, and through this society to the whole world; for these proceedings are published and very widely distributed and read. You could not do it, sir, without conferring a great benefit upon our profession, and I am sure I express the thought in the mind of every dentist in the room, of great gratitude to you for the trouble you have taken in coming here, and also to the gentlemen, your *confrères*, who have done us the honor of being present, and who have so intelligently discussed your paper.

A vote of thanks was given to Dr. Bulkley for his interesting paper.

Adjourned.

W. J. TURNER, M.D., D.D.S.,
*Editor New York Odontological Society.*

## FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting Tuesday evening, November 9, 1897, at the New York Academy of Medicine, No. 17 West Forty-third street; the president, Dr. Alfred R. Starr, in the chair.

After the transaction of routine business, the president introduced FANEUIL D. WEISSE, M.D., of New York, who delivered an address on the "Buccal Manifestations of Syphilis."*

### *Discussion.*

Dr. LOUIS C. LEROY. Is the presence of mucous patches an evidence of recently acquired syphilis?

Dr. WEISSE. No. Syphilis is acquired at the time of the inoculation; then there is a period of incubation of from ten days to four weeks. Six weeks and possibly six months may elapse before secondary symptoms show themselves, so that mucous patches in the buccal cavity may not appear for weeks and even months after the primary lesions.

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*See page 436 of the current number.

Dr. J. F. P. HODSON. Will Professor Weisse carefully differentiate for us the difference between a syphilitic mucous patch and the ordinary canker sore that we commonly see in the mouth?

Dr. WEISSE. It is a pretty sharp line to define, when you have a canker sore to which nitrate of silver has been applied. As a canker sore develops, it is a vesicle because of the stratified epithelium that obtains on the mucous membrane of the buccal cavity. This vesicle is usually broken, and a rim of the vesicle wall remains, inclosing a red excoriated center with an inflammatory circumference. The mucous patch is not surrounded by an inflammatory area, and has the peculiar grayish pellicle upon its surface. The canker sore, to which nitrate of silver has been applied, has a white pellicle of coagulated albumen. A few questions to the patient will develop the short history of the canker sore, and you will frequently find that the patient has been subject to them for years.

Dr. F. J. McLAREN. Is it possible to have necrosis of the alveolar process without syphilis being evident in any other part of the mouth?

Dr. WEISSE. I should not regard necrosis of the alveolar process as an evidence of syphilis. If necrosis is due to syphilis, it always has an antecedent history of syphilis. Where the alveolar process is necrotic, I should look for it to be due to some other cause than syphilis. In the development of periosteal syphilomata or gummata, involving the roof of the mouth, I have never known it to commence in the alveolar process and go backward to the roof of the mouth; but I have seen it commence in the hard palate and sweep forward, so as to destroy the alveolar process and included teeth.

Dr. HODSON. Might not Dr. McLaren mean that we, as dentists, always accept the fact that the upper maxilla with syphilitic history is especially prone to necrosis, and where we have a case of alveolar abscess in such jaws, necrosis promptly appears, rapidly extends, and seems to defy all endeavors to limit such extension as compared with necrosis in the inferior maxilla?

Dr. C. G. PEASE. It is the usual practice to make an examination of the buccal cavity for caries and other lesions without first looking for mucous patches. In view of our knowledge of the communicability from the mucous patch, it would be a wise precaution if the practitioner, in examining the mouths of strangers, would first look for mucous patches before making further examinations.

Dr. S. L. GOLDSMITH. I had a case which I think is apropos. I have been treating a family of six children, varying in age from twenty years to eight years, and in five of the children I found perfectly formed teeth; but in the sixth, a little boy, I found Hutchinson teeth,—even the first permanent molar being very much malformed. I state the case as being one of a rather peculiar nature.

Dr. A. L. SWIFT. Dr. Goldsmith's remarks recall a case of congenital syphilis which was brought to me for consultation by a physician. A child of about four and a half years, with an inflammation extending from the cuspid to the temporary molar, in the lower jaw, with a discharging fistula, and these teeth so loose that they might almost have been extracted with the fingers, and with no previous history of gummata. Upon the removal of the three teeth, the alveolar process was found to be necrosed to a considerable extent. I mention this case of necrosis, without any history of gummata, in such a young child, as probably the direct result of constitutional syphilis.

Dr. McLaren. Was there an alveolar abscess in that case?

Dr. Swift. I think not. There was very little swelling of the soft tissues; pressure on the cheek would cause the pus to ooze up around the gums of these teeth.

Dr. Littig. Were those teeth much decayed?

Dr. Swift. There was not the slightest evidence of decay, but the child's whole body was in a terrible condition.

Dr. Kasson C. Gibson exhibited eleven charts showing perforations of hard and soft palates due to acquired syphilis.

Dr. Weisse. I have not much to say in closing. Judging from the number of cases that have come to me in the last twenty years from dental practitioners,—the dental practitioner is often suspicious of a case of necrosis of the alveolar process that resists the ordinary treatment; that possibly the patient may be a sufferer from syphilis, and he does not exactly feel like questioning the patient about it,—in all my experience I have yet to see a case of necrosis, commencing in the alveolar process, that I could directly ascribe to a syphilitic cause. I am inclined to agree with the statement that necrosis of the upper maxilla, as compared with cases of necrosis of the lower maxilla, is more tedious and difficult to treat.

The only bones that are destroyed by syphilis are flat bones. You remember we have the flat bones of the nose destroyed by syphilis very rapidly, the gummata occurring in the submucous plane of the mucous membrane lining the bone walling the nose cavities, thereby interfering with the nourishment of the bone. The same conditions obtain with the horizontal plates of the palate bones and the palate processes of the superior maxillary bone.

The reason of necrosis of the bones following gummata of the submucous plane of the mucous membrane covering the flat bones is that the vessels of the submucous plane contribute to the nutrition of the bone they cover, and hence, the nutrition being cut off from the bone, necrosis and exfoliation of the bone area involved follows.

These illustrations [referring to Dr. Gibson's charts] show very clearly the loss of bone consecutive to gummata. Even in this illustration you will find that although the hole is very large in the hard palate, it reaches to the alveolar process, but stops there. The hole commences small, and enlarges, as in this case.

In putting in an obturator you must never allow the stem of the obturator that passes into the nose to touch that border [indicating] at all; if you do, the friction will cause absorption of the edge and enlargement of the hole.

I remember the case of an old woman who came to my clinic at the college, some years ago, with a perforation of the hard palate. She had always made her own obturators by using a cork. She had commenced with a phial cork, but when she came to me she was using a demijohn cork.

In respect to cleanliness in all dental operations, which Dr. Gibson referred to, I was glad to be reinforced on that point. With reference to the boiling of instruments, there is another way of disinfecting them—by dipping them in alcohol and burning off the alcohol. I think that effectually destroys all virus or germs.

Dr. HODSON. But would it not ruin the steel instruments?

Dr. WEISSE. I do not know about that. I would like to hear if such is the case.

Dr. SWIFT. I always use that means, and it does not ruin the instruments.

Dr. WEISSE. I am obliged. I think it is the simplest way of disinfecting or sterilizing, and I cannot understand how it would ruin the instrument.

Dr. GOLDSMITH. Is it heat or the production of combustion that destroys the germs or virus?

Dr. WEISSE. The heat reaches the whole surface of the instrument burned off. You dip the forceps, after extracting a tooth, into alcohol and then burn it off. I would regard such an instrument as properly disinfected or sterilized.

A vote of thanks was offered to the essayist and to the gentlemen who took part in the discussion.

Adjournment. B. C. NASH, *Secretary.*

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## ALUMNI SOCIETY OF THE PHILADELPHIA DENTAL COLLEGE.

THE annual meeting of the Alumni Society of the Philadelphia Dental College was held at 3 P.M. March 31, 1898, in the College Building, at Eighteenth and Buttonwood streets. President Leo Greenbaum, M.D., D.D.S., occupied the chair. Many of the alumni were present.

The committee on photographs reported the receipt of the photograph of the late Dr. Thomas Evans, of Paris, and appealed to the alumni in general for gifts of enlarged photographs or oil portraits of men eminent in the profession.

The committee on certificate of membership reported progress.

The following papers were read and discussed:

By Dr. W. G. Chase, of Philadelphia. Subject, "Caries of the Maxilla."

By Dr. W. A. Capon, of Philadelphia. Subject, "Practical Points on Porcelain Inlays."

By Dr. J. A. Bolard, of Philadelphia. Subject, "Experiences in Dental Practice."

The election of officers resulted as follows: Professor Leo Greenbaum, president; Dr. Charles E. Butler, Dr. J. W. Allen, vice-presidents; Dr. Charles Vanderslice, treasurer; Dr. Otto E. Inglis, secretary; Dr. Eliza Yerkes, corresponding secretary.

OTTO E. INGLIS, *Secretary.*

## CHICAGO DENTAL SOCIETY.

FOLLOWING is the list of officers of the Chicago Dental Society for 1898-99, elected at the annual meeting, held in the Stewart Building, Tuesday evening, April 5, 1898: J. E. Hinkins, president; D. C. Bacon, first vice-president; E. A. Royce, second vice-president; Elgin Ma Whinney, recording secretary; C. S. Bigelow, corresponding secretary; E. D. Swain, treasurer; J. G. Reid, member board of directors; A. W. Harlan, W. V.-B. Ames, C. N. Johnson, board of censors.

C. S. BIGELOW, *Corresponding Secretary.*

## G. V. BLACK DENTAL CLUB.

AT the second annual meeting of the G. V. Black Dental Club, of St. Paul, Minn., held May 5, 1898, the following officers were elected for 1898-99: Dr. Glen F. Andrews, president; Dr. James E. Weirick, vice-president; Dr. J. Milton Walls, secretary and treasurer; Dr. Russell W. Berthel, corresponding secretary.

J. M. WALLS, *Secretary.*

## COLUMBUS DENTAL SOCIETY.

THE second anniversary of the Columbus Dental Society was celebrated by the customary dinner April 25, 1898, and the following officers were elected for the ensuing year: Otto Arnold, president; M. A. Harrison, vice-president; C. A Hawley, secretary.

## DENTAL SOCIETY OF THE STATE OF NEW YORK.

AT the thirtieth annual meeting of the Dental Society of the State of New York, held in Albany, May 11 and 12, 1898, the following officers were elected for the ensuing year: F. Le Grand Ames, D.D.S., Albany, president; John I. Hart, D.D.S., New York, vice-president; Charles S. Butler, D.D.S., Buffalo, secretary; Charles W. Stainton, D.D.S., Buffalo, treasurer; R. Ottolengui, M.D.S., New York, correspondent. CHARLES S. BUTLER, *Secretary.*

# DENTAL COLLEGE COMMENCEMENTS.

## VANDERBILT UNIVERSITY—DEPARTMENT OF DENTISTRY.

The nineteenth annual commencement exercises of the Dental Department of Vanderbilt University were held in the Vendome Theater, Nashville, Tenn., on Thursday, March 31, 1898.

The charge to the graduates was delivered by Rev. James A. Duncan, D.D., and the valedictory by Rinaldo Allmon, D.D.S.

The number of matriculates for the session was one hundred and eighty-five.

The degree of D.D.S. was conferred on the following graduates by Chancellor J. H. Kirkland, A.M., Ph.D., LL.D.:

| NAME. | STATE OR COUNTRY. |
|---|---|
| Rinaldo Allmon | Alabama. |
| Henry E. Becker | Kentucky. |
| Jas. A. Banks | Missouri. |
| Wm. R. Boote | Hawaii. |
| Edgar B. Bradshaw | Kentucky. |
| Woodford A. Brooks | Texas. |
| Louis H. Cawthon | Florida. |
| Wm. R. Chisholm | Alabama. |
| Jno. T. Cook | Alabama. |
| Albert H. Davis | Tennessee. |
| Donaldson I. Dupree | Tennessee. |
| Lee Elliott | Tennessee. |
| Wm. B. L. Ferguson | Texas. |
| Benj. T. Hager | Tennessee. |
| Thos. L. Hale | Tennessee. |
| Lee M. Hatfield | Tennessee. |
| Henry H. Hawsey | Louisiana. |
| Geo. W. Heard | Texas. |
| Jno. F. Hight | Arkansas. |
| Jno. L. Hill | Tennessee. |
| Wm. T. Hoard | Texas. |
| A. E. Hockersmith | Kentucky. |
| Huber H. Hord | Kentucky. |
| Fred. M. Irwin | Texas. |
| Walter C. Jelks | Mississippi. |
| Wm. Kramm | Illinois. |
| Robert L. Lacey | Alabama. |
| Marx M. Levy | Louisiana. |
| Wm. A. Matthews | Tennessee. |
| Eugene O. Moore | Mississippi. |
| B. N. Mosely | Texas. |
| Royal R. Mulkie | Texas. |
| Clarence R. Nalm | Kentucky. |
| Jno. B. Newell | |
| Thos. J. Newman | Mississippi. |
| Samuel R. Norwood | Louisiana. |
| Addison K. Parks | Kentucky. |
| Leo G. Pierson | Alabama. |
| Jas. B. Powell | Mississippi. |
| Isaac H. Read | Tennessee. |
| Celia Rich | Tennessee. |
| Fred. M. Rose | Texas. |
| Rufus B. Sadler | Arkansas. |
| Frank I. Shaw | California. |
| Jno. B. Simms | California. |
| Jno. H. Stubbs | Kentucky. |
| Justen D. Towner | Tennessee. |
| Robt. H. Welsh | Alabama. |
| Jackson R. Walker | Alabama. |
| Parham P. Walker | Mississippi. |
| Alfred B. West | Louisiana. |
| Jas. C. Westbrook | Alabama. |
| Andrew H. Whitman | Alabama. |
| Wm. S. Williams | Kentucky. |

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## OHIO MEDICAL UNIVERSITY—DEPARTMENT OF DENTISTRY.

The sixth annual commencement exercises of the Dental Department of Ohio Medical University were held at the Auditorium, Columbus, Ohio, April 5, 1898.

The number of matriculates for the session was one hundred and three.

The degree of D.D.S. was conferred upon the following graduates:

| | |
|---|---|
| Frank M. Casto | Ohio. |
| Chalmers E. Camp | Pennsylvania. |
| John L. Crawford | Ohio. |
| Edward M. Fisher | Ohio. |
| John E. Fowler | Ohio. |
| William C. Graham | Ohio. |
| Jesse E. Hikes | Ohio. |
| Allison R. Jones | Ohio. |
| John Lehner | Pennsylvania. |
| Charles McCracken | Minnesota. |
| Edwin W. Martindale | Ohio. |
| Lee B. Peterson | Ohio. |
| Harry J. Shaffer | Pennsylvania. |
| William S. Sykes | Ohio. |

## UNIVERSITY OF TENNESSEE—DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the University of Tennessee were held in Nashville on Tuesday, March 29, 1898.

The charge to the graduates was delivered by Professor Boyd Bogle, M.D., D.D.S., and the valedictory by H. S. Boyer, D.D.S.

The number of matriculates for the session was ninety-seven.

The degree of D.D.S. was conferred on the following graduates by Mr. James Maynard, of the university:

| NAME. | STATE. | NAME. | STATE. |
|---|---|---|---|
| E. D. Barton | Alabama. | A. J. Hartenstein | Tennessee. |
| F. A. Barber | Kentucky. | D. M. Haste | Tennessee. |
| H. S. Boyer | Tennessee. | F. M. Jenkins | California. |
| M. A. Drummond | S. Carolina. | J. W. Montgomery | Missouri. |
| H. K. Fink | Illinois. | R. M. Risenhomer | Kentucky. |
| C. T. Fisher | Arkansas. | S. P. Simms | Mississippi. |
| F. E. Godfrey | Missouri. | E. S. Woolfolk | Missouri. |

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# DENTAL SOCIETY ANNOUNCEMENTS.

## NATIONAL DENTAL ASSOCIATION.

THE next annual meeting of the National Dental Association will be held in Omaha, commencing on Tuesday, the 30th day of August, 1898.

Attention is called to the fact that all who were members of the American Dental Association and of the Southern Dental Association at the time of the formation of the National Dental Association are now members of the latter organization.

The Constitution, Article III, Section 5, provides as follows:

"It is hereby specially provided that all persons at present permanent members of the American Dental Association and of the Southern Dental Association are permanent members of this association, and entitled to all the privileges of the class to which they belonged without further action, and the treasurer is hereby directed to transcribe their names upon the roll of membership of this association."

The officers of the National Dental Association will leave nothing undone to make the meeting at Omaha a success, and they hope the attendance and interest in the first active annual meeting of the association will be commensurate with its importance.

By order of
THOMAS FILLEBROWN, *President.*

EMMA EAMES CHASE,
*Corresponding Secretary.*

## PENNSYLVANIA STATE DENTAL SOCIETY.

THE Executive Committee desires to announce that on account of circumstances over which they had no control, the place of holding the annual meeting has been changed from Cresson to Ebensburg.

The committee feel that in selecting the latter place they have acted wisely. Ebensburg is the county seat of Cambria county, and is a most delightful old town, located on the summit of the Allegheny Mountains, and readily accessible via Pennsylvania Railroad and Cresson. Headquarters will be at the Maple Park Springs Hotel, and the meetings will be held in the Court House. Booklet and program will be sent out about June 10.

Annual session, July 12, 13, and 14.

I. N. BROOMELL, *Chairman Exec. Com.*,
302 N. Fortieth st., Philadelphia.

## TENNESSEE DENTAL ASSOCIATION.

THE thirty-first annual meeting of the Tennessee Dental Association will be held in the auditorium of Lookout Inn, Lookout Mountain, Tenn., commencing July 5, 1898, and continuing the 6th and 7th. A fine program is being prepared, consisting of papers and clinics by eminent men of the profession. The Inn has made the exceedingly low rate of $2.00 per day for members and visiting friends. Come and enjoy the glories of old Lookout with us for a few days. Excursion rates on all railroads to Lookout Mountain.

CHAS. H. SMITH, *Secretary*,
Chattanooga, Tenn.

The Tennessee State Examining Board will meet at Lookout Inn on Monday, July 4, at 9 A.M. All applicants for examination must present themselves on that day.

J. L. NEWBURN, *President*, Memphis.
F. A. SHOTWELL, *Sec'y*, Rogersville.

## WISCONSIN STATE DENTAL SOCIETY.

THE twenty-eighth annual meeting of the Wisconsin State Dental Society will be held at Madison, July 19-21, 1898. An interesting program will be provided. A cordial invitation is extended to all dentists in the state of Wisconsin who are not members of the society, and also dentists of other states, to attend our meeting. Hotels and railroads will make the usual reduction.

R. G. RICHTER, *President*,
W. H. MUELLER, *Secretary*,
21 West Main street, Madison, Wis.

## MISSOURI STATE DENTAL ASSOCIATION.

THE thirty-fourth annual meeting of the Missouri State Dental Association will convene at Merrimac Highlands (near St. Louis) July 5, 6, 7, and 8, 1898.

All dentists practicing in the state of Missouri who are not members (and wish to become members) of the association, and dentists of other states, are cordially invited to attend.

When purchasing your railroad ticket, be sure and get your certificate from ticket agent, so you can get the rebate on return ticket.

A large attendance is anticipated, and we are assured of a royal meeting.

H. H. SULLIVAN, *Rec. Secretary*,
Kansas City, Mo.

## NORTHERN IOWA DENTAL SOCIETY.

The fourth annual meeting of the Northern Iowa Dental Society will be held at Waterloo, July 5, 6, and 7, 1898. A very fine program is being prepared, and we expect to have an interesting and profitable meeting.

The Waterloo Chautauqua Assembly will be in session, and all who attend the meeting will have an opportunity to take in some of the best numbers on the program. Reduced rates on all railroads.

Wm. H. Steele, *Secretary*,
Forest City, Iowa.

## MASSACHUSETTS BOARD OF REGISTRATION IN DENTISTRY.

A meeting of the Massachusetts Board of Registration in Dentistry for the examination of candidates will be held in Boston, Monday, June 13, 1898, at 9.30 a.m., at Boston Dental Infirmary, Tremont street. Examination in operative dentistry at 10 o'clock.

Each candidate must come prepared with rubber-dam, gold, and instruments to demonstrate his skill in operative dentistry. Any one who wishes may bring his patient. So far as possible patients will be furnished.

The theoretic examination will include anatomy, physiology, histology, chemistry, pathology, materia medica, operative and prosthetic dentistry.

All applications, together with the fee of twenty dollars, must be filed with the secretary of the board on or before June 6, as no application for this meeting will be received after that date.

G. E. Mitchell, D.D.S., *Secretary*,
25 Merrimack street, Haverhill, Mass.

## NEW JERSEY SUMMER EXAMINATIONS.

The New Jersey Dental Examining Board will hold the summer examinations at the commission rooms, No. 88 Broad street, Elizabeth, N. J., commencing on Tuesday, July 5, 1898, and lasting for three days. All applications must be in the secretary's hands before June 21.

Attention is called to the new dental law of the state, which requires preliminary education equal to a high school graduation in New Jersey. Candidates who have not the necessary papers to show this standard will be given an examination held under the supervision of the State Superintendent of Public Instruction; all preliminary examinations must be finished before the applications can be accepted.

G. Carleton Brown, *Secretary*,
No. 88 Broad street, Elizabeth, N. J.

## PENNSYLVANIA DENTAL EXAMINING BOARD.

The Board of Dental Examiners of the State of Pennsylvania will hold an examination in Philadelphia, commencing June 14, 1898, of candidates for a license to practice dentistry in this state. Application must be made to the Dental Council at Harrisburg, Pa., for blank examination papers.

J. C. Green, *Secretary*.

## MAINE BOARD OF DENTAL EXAMINERS.

A MEETING of the Board of Dental Examiners of the State of Maine will be held for the examination of applicants at the Eye and Ear Infirmary, corner of Congress and Vaughan streets, Portland, on Wednesday, June 22, 1898, at 2 o'clock.

Each applicant is required to bring gold and such instruments and appliances as he may require in operating upon the teeth.

To secure examination at this meeting the application must be filed and the fee of twenty dollars must be paid to the secretary on or before Saturday, June 18. D. W. FELLOWS, M.D., *Secretary,*
23 Free street, Portland.

## CALIFORNIA STATE DENTAL ASSOCIATION.

THE twenty-seventh annual session of the California State Dental Association will be held at San Jose, Cal., beginning Tuesday, June 21, 1898, and continuing four days. FRANK C. PAGUE, D.D.S., *Cor. Sec.,*
135 Geary st., San Francisco.

# EDITORIAL.

## ORAL SYPHILIS.

WE present in this issue two important articles on oral syphilis, by observers entirely competent to deal with the subject intelligently and accurately; one eminent as a syphilographer, and the other well known as an authority upon oral diseases. These two articles, with the discussions thereon, may be taken as fairly representing the existing state of our knowledge as to the prevalence of syphilitic mouth-lesions, not in an accurate, statistical way, but as a general approximation.

Perhaps there is no subject dwelt upon with more emphasis in dental college courses everywhere than the danger of syphilitic infection by inoculation during dental operations. Even though the pathology and therapeutics of syphilis may not form a conspicuous feature of the course, the one fact of its contagiousness is invariably emphasized, and the diagnosis of its oral lesions and the precautionary measures to be observed in dealing with such cases are thoroughly taught. Moreover, the lesson is usually learned, for it is rare to find a dentist who has not become imbued with a wholesome dread of acquiring or communicating the disease, or who does not take reasonable precautions against these disastrous possibilities. The experience of Professor Weisse that dentists "have a dread of the buccal manifestations of syphilis" is direct evidence of their appreciation of its harmfulness, and is a strong indication of their knowledge of its characteristics. Forewarned of its terrors, equipped with a fair knowledge of the mouth-lesions caused by it, trained as observers of oral pathological conditions and with constant opportunities for making examinations of the oral cavity, it is certainly a noteworthy fact that so few cases of oral syphilis are recorded in dental literature. By oral syphilis is here meant the active manifestations of the disease in the mouth.

The infrequency of recorded cases may possibly be due to the fact that unless the particular lesion presents features of especial interest it may not have been considered of sufficient importance to report; or, on the other hand, it may indicate that oral syphilitic lesions are not as prevalent as they have been assumed to be. We are inclined to the latter view, for the reason that during twenty years of general observation and practical study of the oral cavity in private practice probably not over a dozen cases of active syphilitic lesions have been noted. Occasional cases of leukoplakia and gummata, as well as of pathological manifestations the result of syphilitic inheritance, have been observed; but, all told, the number of cases in which the syphilitic virus was the direct or remote cause of the oral lesion have, in the writer's experience, been relatively very few. It is undoubtedly true that syphilitic lesions are more likely to be observed in hospital and clinical practice than in a private practice among a better social class, but even in the practice of the dental and oral clinic syphilitic lesions are comparatively rare. We are inclined to attribute the relative infrequency of oral syphilis to a much lower grade of contagiousness than is popularly assigned to it.

Certainly if syphilis were possessed of a degree of contagiousness like the exanthemata and many other disorders of germ origin, no member of the community would escape its ravages. The fact that immediate contact with the morbid element of syphilis is necessary before inoculation can occur of course diminishes in a large degree the chances of contagion. There is also the other important factor modifying the chances of syphilitic contagion,—viz, the protection afforded by the epithelial covering of the organism, it having been shown that a break or abrasion of the surface is almost essential to the entrance of the virus. Another consideration which may possibly act as a modifying element in the contagiousness of syphilis is the possible, even probable, immunity which in the course of time is being established in the human organism against this dreaded disease. The inoculation of a community with syphilis must in the course of time permeate the whole class in some degree, until it would be practically impossible to find a given individual whose ancestral line had not at some point, more or less remote, been invaded by the disorder, and it is not assuming more than is already demonstrated by pathologic research to believe that the evolutional development of individuals in an environment originally capable of producing acute pathological processes eventually establishes an immunity toward such environment.

Whatever of truth these suggestions may contain, certain it is that the frequency of syphilitic mouth-lesions is by no means as great as might be inferred from the popular ideas upon the subject; and still further, the types of the disorder, so far as the mouth is concerned, must have undergone modification and amelioration if the descriptions of earlier writers on the subject are to be taken as representing truthfully the conditions then met with.

It is by no means to be inferred from the foregoing that laxity in safeguards against the disease is advocated. The consequences of infection when it does occur are sufficiently appalling to keep every practitioner upon his most vigilant guard to protect himself and his patients therefrom. But we may exercise due care, and yet have a less superstitious dread of infection by this disorder, even if we should by a study of the facts find that it was less contagious than it has been assumed to be.

## THE MEDICO-CHIRURGICAL COLLEGE MAY CONFER D.D.S., PH.G., AND PH.D. DEGREES.

JUDGE GORDON has dismissed the exceptions of the Philadelphia Dental College, which sought to restrain the Medico-Chirurgical College from conferring graduate degrees in dental surgery and pharmacy. The Medico-Chirurgical College's petition to so amend its charter as to comprehend this broadening of the institution's field of usefulness has accordingly been granted.

The decision of Judge Gordon, beside its analysis of the equities involved, is of interest as defining the status of dentistry in its relation to medicine from the legal point of view.

The opinion, in full, is as follows:

"In the matter of the petition of the Medico-Chirurgical College of Philadelphia for an amendment to its charter.

"Sur exceptions of Philadelphia Dental College.

"We are of opinion that under the original act of incorporation of this college, on February 12, 1850, and its supplement of the 10th of April, 1867, the institution possesses the power to confer degrees in dental surgery and pharmacy.

"The original act of incorporation empowers the college, among other things, to establish a department of instruction in 'surgery (including dental surgery) and pharmacy.' The supplemental act of 1867 confers upon the college 'all the rights, immunities, and privileges as to lecturing, granting diplomas, and conferring degrees in medicine as is possessed by the officers and professors of the University of Pennsylvania at this time.'

"As was said by the attorney-general of the state, in an opinion touching the right of colleges to confer degrees, 'The conferring of a degree simply marks a step in the educational career of the student. It is the expressed judgment of the faculty that he has attained a certain degree of proficiency, and a diploma is granted as the evidence of such degree. The value of a degree depends entirely upon the character and standard of the institution conferring it. It may mean much or it may mean little.'

"We believe that the general grant of powers to this corporation comprehends the right to grant diplomas and confer degrees evincing the proficiency of its students in the various branches expressly authorized to be taught. Moreover, the original act of incorporation specially excluded the right to confer the degree of Bachelor of Medicine or Doctor of Medicine, which would seem to have been a legislative interpretation that but for this exclusion the right to confer these two degrees would have been included in the general grant of powers. While it is true that a proviso or exception to an act cannot enlarge the language of the act or amplify a grant of power, still it may have effect and value as indicating the general legislative intent.

"The third section of the act of incorporation recites, 'That no enumeration of powers, privileges, and duties herein contained shall be so construed to exclude others not enumerated which are necessary to the fulfillment of the designs and purposes of this act, and not inconsistent with its express provisions and limitations.' It can hardly be claimed that the granting of degrees in dental surgery and pharmacy is inconsistent with any express provision or limitation in an act specially conferring the power to establish a department for the teaching of dental surgery and pharmacy, or that the granting of such degrees is not necessary to the fulfillment of the designs and purposes of the act of incorporation. Conclusive force, we think, must be given to this argument in view of the special exclusion in the act of the two particular degrees in medicine referred to above.

"Again, the supplementary act of 1867, amplifying the original act of incorporation, brushed away even this limitation upon the power of the college to confer degrees, and granted plenary authority to confer all the degrees in medicine possessed by the University of Pennsylvania at that time.

"Why would not this grant of power include degrees in dental surgery and pharmacy? Are not dental surgery and pharmacy branches of 'medicine'? The students in dental surgery are instructed, we are informed, in anatomy, physiology, chemistry, therapeutics, materia medica, pathology, and other branches of medical science, while in pharmacy chemistry, physiology, materia medica, and therapeutics are branches of instruction. Indeed, the later and better tendency is to closely ally both pharmacy and dental surgery to the parent science medicine, and to have the students in all three of these sciences matriculate with the same institution.

"The growth in the dignity and efficiency of dental surgery is largely due to the fact that the practitioners in this art to-day, unlike their representatives in the past, are educated carefully in allied medical studies. For this reason most of the great colleges of medicine have now regularly established schools or departments in dental surgery and pharmacy, and the students in these branches seek institutions where they may have the advantage of medical clinics.

"The powers asked for in the amendment now before the court we, therefore, think are already included in the chartered rights of this college, but, for the improvement and clarification of the charter, the amendment asked for is proper and should be allowed.

"Even if we had doubt as to this view, we still regard the amendment asked for as a proper one and within the scope of judicial power, and it would be granted.

"The petition is therefore allowed, and a decree will be made accordingly.

"JAMES GAY GORDON."

## PERCENTAGE SOLUTIONS.

SINCE the advent of cocain and other local anesthetics in dentistry, solutions of various percentages of strength have been recommended for hypodermatic use, and much confusion has grown out of the indefiniteness of the term per cent., used to designate the strength of solution employed.

The essential cause of this confusion is to be found in our blind adherence to the English system of weights and measures, which is arbitrary and illogical, instead of adopting the French or metric system as our official standard.

As by the metric system the unit of weight is directly convertible into volume terms, a percentage solution by that system is readily formulated. For example, one gramme of cocain dissolved in water sufficient to make 100 cubic centimeters would furnish a one per cent. solution, for the simple reason that one gramme and one cubic centimeter of water at normal temperature and pressure have the same weights, and a solution made as above would consist of one part of cocain in 100 of water, volume and weight corresponding exactly.

By Troy or English measure the case is different. If our solution is to be by volume, there being 480 minims in a Troy ounce fluid, a one per cent. solution would be made by adding 4.8 grains to one fluidounce, and the resulting solution would contain 1-100 of a grain in each minim of fluid. Multiples of the quantity of cocain salt required for the one per cent. solution readily give the quantities required for higher percentage solutions.

The Troy ounce of water, however, weighs 455.69 grains, so that if the percentage solution were to be made by weight, a one per cent. solution would be made by adding 45.6 grains to one fluidounce of water.

The common practice among apothecaries in making percentage solutions of cocain is to base the calculation upon volume, so that the percentage will in each case indicate the fraction of a grain in hundredths which each minim of solution contains.

The foregoing is here published in answer to numerous inquiries on the subject.

## DENTIST OR STOMATOLOGIST?

FROM the *Western Dental Journal* for April, 1898, page 180, we quote the following:

> "*Dentistry or Stomatology.*—The COSMOS for March devotes six pages to an article by Dr. T. C. Stellwagen, of Philadelphia, trying to prove that the name 'stomatology' should be adopted by the dental profession, and that we should be denominated 'stomatologists' instead of 'dentists.' We think so long as the large majority in the profession only work upon the teeth, and pay no attention to the diseases of the mouth, that the words 'dentistry' and 'dentist' should stand. One practicing oral surgery, or giving special attention to diseases of the oral mucous membrane, should be properly a 'stomatologist.'"

And from page 181, same issue, the following:

> "*Extract from a Discussion.*—'Dr. Arrington. Do I understand you to distinctly say that pyorrhea begins at the apex of the root?
>
> "'Dr. Peirce. Emphatically, yes; at the apex, along the same line as in the joints in connective tissue. It is at the end of the root that true pyorrhea begins, without any disturbance at the gingival border; the opening through the gum-tissue is opposite the apical end of the root, the pulp being alive, though the external appearance is the same as that of an abscess from a dead pulp; the discharge is from the region of the apical end of the root, with the pulp intact. It is amenable to treatment. Remove the accumulation through that opening in the tissues. That is why I say true pyorrhea is an expression of the uric acid diathesis, and must be treated constitutionally, with the addition of local treatment for the external expressions of the disease.'—*Cosmos.*
>
> "When such erudite pronunciamentos come from prominent men in dentistry, is it any wonder that our profession does not receive the best recognition?"

Query: Does the editor of the *Western Dental Journal* make his criticism on the "erudite pronunciamentos" as a dentist, or as a stomatologist? If he is a dentist according to his own definition, he pays no attention to diseases of the mouth. On the other hand, if he does pay attention to the diseases of the mouth, then by his own showing he is a stomatologist. The solution of this problem is necessary before we can determine the specific gravity of his criticism.

# BIBLIOGRAPHICAL.

A MANUAL OF DENTAL ANATOMY, HUMAN AND COMPARATIVE. BY CHARLES S. TOMES, M.A., F.R.S. With 263 illustrations. Fifth Edition. Philadelphia, P. Blakiston, Son & Co., 1012 Walnut street, 1898.

The late Sir Richard Owen published his great work on "Odontography" in 1845. It was a masterful production and for many years stood almost alone in its particular field, and still, although entirely out of date in some of its features, remains a most valuable work of reference.

The recently issued fifth edition of Mr. Charles Tomes's "Manual of Dental Anatomy, Human and Comparative," occupies much the same position to-day that Owen's "Odontography" did in 1845. It is true there is now a great mass of scattered literature on almost every subject treated which did not exist fifty years ago, but there is no other single work which can divide honors with Tomes's Dental Anatomy, and there is probably no living man so well qualified on all points to produce an exhaustive work on this subject as Mr. Charles S. Tomes. The work under review makes no pretence of being exhaustive. Mr. Tomes says in his preface that "In the first instance, the book was written largely with a view of providing students working for a qualifying examination in dental surgery with a hand-book of a distinctly elementary kind. But, in the absence of other works of a similar scope, it has happened that it is used by students of biology in general, and to meet their requirements it has been necessary to expand those portions which treat of comparative odontology." But although issued as a hand-book or manual, it is not going too far to say that it is far the most complete work we possess on the subject, and that any one who has completely mastered its contents is not only well fitted to pass any examination in comparative dental anatomy, but is also thoroughly qualified to undertake original research in any part of this field. And, from my point of view, this is the chief merit of the book. There are many indications that the next decade will produce a great amount of original investigation on many of the subjects treated in this volume under consideration, and any one contemplating work of this character will do well to make the careful reading of this book his first step. I find that in my own work I have referred to Tomes's Dental Anatomy more frequently than to any other work. I believe the principal reason for the value of this book as a work of reference is to be found in the broad culture and catholicity of the author and his freedom from fads and theories. In histological work he recognizes the difficulty and danger of pronouncing dogmatic conclusions. He presents all views with fairness, and when unable to agree with an author quoted he gives his reasons and leaves the matter without further comment. The result of this is that the student or investigator rising from the perusal of this work has a fair conception of the views of the leading investigators in the field of dental histology, and is, or should be so far as the influence of the author is concerned, free from prejudice as to any of the views presented. These qualities, as I have said, make Tomes's Dental Anatomy especially valuable both to dental students and to those engaged in research work. It is further gratifying to remark that on the most essential points there is now substantial agreement among the most advanced workers in dental histology.

Mr. Tomes's book is arranged in sixteen chapters, in the first six of which we are given a brief but clear and comprehensive survey of the development and structure of the dental tissues in the teeth of fishes, reptiles, and mammals, the eruption of the teeth and development of the jaws and the various methods of the attachment of teeth.

In treating the subject of the presence or absence of enamel on the teeth of certain fishes, reptiles, and mammals, Mr. Tomes inclines to the view that a very thin layer of rudimentary enamel often exists where it has not been suspected. He evidently bases this view largely upon his experience that formative enamel-organs occur universally in the development of teeth. In the case of the frog, for instance, there is a perfectly developed enamel-organ, but Mr. Tomes is not quite certain whether true enamel is really formed. My own specimens appear to me to show an unmistakable formation of enamel in the *developing* teeth of the frog, although I have not been able to detect it on the fully formed and erupted teeth, but I have attributed this to its removal by the acid of the fixing fluids used.

Mr. Tomes's analysis of mature mammalian enamel leads him to the conclusion that there is but the faintest trace, if any, of organic matter in this tissue, and this is also in accordance with the latest conclusions from other standpoints. Mr. Tomes has recently reinvestigated the very interesting subject of *tubular* enamel as found in the marsupialia, in some rodents, insectivora, and in many fishes. In this investigation he has reached conclusions at variance with the views of his father, the late Sir John Tomes, and also with his own former convictions. He concludes that the tubes or fibers seen in marsupial enamel are not ingrowths from the dentin, but that they are a true enamel production. Mr. Tomes's present view on this point is that all enamel passes through a stage in its development when the rods or prisms are tubular (this condition being brought about by the calcification of the enamel-rod from without inward), and that the tubes in marsupial enamel "are merely arrests of complete development and perpetuations of a stage which is transitory in placental mammals." There are undoubtedly some appearances which tend strongly to confirm this new view put forward by Mr. Tomes, but at the same time I think he has overlooked some very important facts which will have to be carefully considered before a final conclusion can be reached. The investigation of marsupial enamel is hedged about by great difficulties which can hardly be understood or appreciated except by those who have worked at the problems.

In the formation of dentin Mr. Tomes adopts the views of Mr. J. Howard Mummery that dentin is formed in a very fine connective-tissue fiber matrix. This view, which has not received the attention in America that it deserves, is, I believe, correct, although I am not quite certain that Mr. Mummery is altogether right in his views as to the origin of the fiber matrix. On the nature of the dentinal fibers and the connections, if any, between these fibers and the nerve terminations in the pulp, Mr. Tomes presents nothing especially new. He calls attention to Mr. Hopewell Smith's statement that the odontoblasts suggest multipolar ganglion cells,—a resemblance which I pointed out some fifteen years ago or more.

Mr. Tomes's classification of the different forms of dentin appears to me altogether satisfactory and more rational than the method recently proposed by Röse.

The chapter on calcification covers thirty-five pages, and is therefore fairly exhaustive. Although the author does not in this chapter distinctly state that he regards the Tomes's processes of the ameloblasts as continuations of the cytoplasm of the cells undergoing calcification, yet I believe this is the view which he really holds, and this coincides with my own conclusions. If disposed to be keenly critical this is the particular chapter which I should select for comment, but, as I have previously intimated, Mr. Tomes almost disarms criticism by his broad catholicity, and, furthermore, fine differences of opinion had better be repressed in reviewing a work which is, on the whole, so valuable and reliable for the student and written in the best scientific spirit.

The chapter on the attachment of teeth, although short, is much the best presentation of the subject, both in text and illustrations, that has ever been given so far as I know.

The section in which Mr. Tomes considers the history of teeth from the standpoint of evolution covers about sixty-five pages, and is more than worth the price of the entire volume. It is a very carefully thought out criticism of all that has been written of importance upon the subject. The remainder of the book includes nearly two hundred and fifty pages in which almost every representative form of tooth is figured and described.

The bibliography of the work is fairly complete, and it is also well indexed. As a text-book for the use of students its value might, in the view of the writer, be enhanced by an addition, perhaps in the form of an appendix, in which should be arranged questions covering all the salient points of the work, with page references indicating where the proper answers might be found. Or, if such an addition might be thought to detract somewhat from the dignity of a scientific work, it could be issued under separate covers for students' use, and for this purpose it would multiply the usefulness of the book many times. But as it stands it is a work which every self-respecting student and practitioner should possess *and study.*

J. Leon Williams.

## Books Received.

The following publications have been received and in a later issue will be given extended notice, which the demands upon our space preclude from the present number:

Harris's Principles and Practice of Dentistry. 13th edition.

Dental Pathology and Medicine (Quiz Compend). G. W. Warren.

Dental Metallurgy. Ernest A. Smith. (P. Blakiston, Son & Co., Philadelphia.)

Transactions Southern Dental Association, 1897.

Transactions American Dental Association, 1897. (The S. S. White Dental Mfg. Co., Philadelphia.)

Dental Pathology, Therapeutics, and Pharmacology. Henry H. Burchard, M.D., D.D.S. (Lea Brothers & Co., Philadelphia.)

Mechanical Practice in Dentistry. Wm. Booth Pearsall. (C. Ash & Sons, London.)

# DENTAL LEGISLATION.

## AMENDED DENTAL LAW OF NEW YORK.

THE following amendments to the dental law of New York have been passed by the state legislature, and were approved by the Governor April 20, 1898. The amendments are designated by the use of *italic* types:

The people of the state of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. The first paragraph of article nine of chapter six hundred and sixty-one of the laws of eighteen hundred and ninety-three, entitled "An act in relation to the public health, constituting chapter twenty-five of the general laws," as amended by chapter six hundred and twenty-six of the laws of eighteen hundred and ninety-five, is hereby amended so as to read as follows:

Definitions, as used in this article.—The terms university, regents, and physicians have respectively the meaning defined in article eight of this chapter. Board, where not otherwise limited, means the State Board of Dental Examiners of the State of New York. Registered medical or dental school means a medical or dental school, college, or department of a university, registered by the regents as maintaining a proper educational standard and legally incorporated. Examiner, where not otherwise qualified, means a member of the board. State Dental Society means the Dental Society of the State of New York.

SEC. 2. The third subdivision of section one hundred and sixty-two of said act, as amended by chapter six hundred and twenty-six of the laws of eighteen hundred and ninety-five, is hereby amended so as to read as follows:

Licenses.—On certification by the Board of Dental Examiners that a candidate has successfully passed the examination and is competent to practice dentistry, the regents shall issue to him their license so to practice pursuant to the rules established by them. Upon the recommendation of the board, the regents may also, without the examination hereinbefore provided for, issue their license to any applicant therefor who shall furnish proof satisfactory to them that he has been duly licensed to practice dentistry in any state or country after full compliance with the requirements of its dental laws, and has been thereafter lawfully and reputably engaged in such practice for five years next preceding his application; *or who holds a license to practice dentistry in any other of the United States granted by a state board of dental examiners, indorsed by the Dental Society of the State of New York, provided that in either case* his preliminary and professional education shall have been not less than that required in this state. The regents may also license any applicant on the certificate of the board that, after due investigation or examination, it finds his education and professional attainments and experience of not less than five years in actual practice to be together fully equal to the requirements for license in this state. Every license so issued shall state upon its face the grounds upon which it is granted, and the applicant may be required to furnish his proofs upon affidavit.

SEC. 3. The first paragraph of section one hundred and sixty-four of said act, as amended by chapter six hundred and twenty-six of the laws of eighteen hundred and ninety-five, is hereby amended so as to read as follows:

(a) A person who, in any county of this state, practices or holds himself out to the public as practicing dentistry, not being at the times of said practice or holding out a dentist licensed to practice as such in this state and registered in the office of the clerk of such county, pursuant to the general laws regulating the practice of dentistry, is guilty of a misdemeanor and punishable upon conviction of a first offense by a fine of not less than fifty dollars, and upon conviction of a subsequent offense by a fine of not less than one hundred dollars, or by imprisonment for not less than two months or by both such fine and imprisonment. Any violation of this section by a person theretofore convicted under the then existing laws of this state of practicing dentistry without license or registration shall be included in the term a subsequent offense. *Every conviction of unlawful practice or holding out subsequent to a first conviction thereof shall be a conviction of a second offense. Every practitioner of dentistry must display in a conspicuous place upon the house or in the office wherein he practices his full name. If there are more chairs than one in any office or "dental parlor" the name of the practitioner using each chair must be displayed on or by said chair in plain sight of the patient. Any person who shall practice dentistry without displaying his name as herein prescribed, and any proprietor, owner, or manager of a dental office, establishment, or parlor who shall fail so to display or cause to be displayed the name of each person employed as a practicing dentist, or practicing as a dentist in said office, establishment, or parlor, is guilty of a misdemeanor and punishable upon a first conviction by a fine of fifty dollars, and upon every subsequent conviction by a fine of not less than one hundred dollars or by imprisonment for not less than sixty days, or by both fine and imprisonment.*

SEC. 4. This act shall take effect immediately.

# PERISCOPE.

PRACTICAL AND THEORETICAL TRIALS OF FORMAGEN.—In medical science it is customary, when battling against those diseases whose cure has for the moment not been established, to constantly introduce new agents, which mostly disappear as quickly as they come upon the scene. So it is in our dental science as regards the treatment of the pulp. It would be beyond our province to enumerate here all the means which have been lauded as being unsurpassable specifics for pulp-treatment. It may suffice to state the fact that nearly every dentist varies the orthodox pulp-treatment according to his own method; and that many, we might maintain even that most, agents have been employed for this purpose without it being possible in advance to determine for certain the result. It need not be particularly emphasized how depressing it is for the practitioner, after treatment extending over weeks, to observe failure, and to have after all to proceed to the extraction of the tooth.

Some years ago a forty per cent. solution of formaldehyd $CH_2O$ came into the market under the name of formalin; the solution was colorless, neutral, and was recommended as a disinfecting agent. Aldehyd is the product of weakly oxidizing influences upon alcohol; formaldehyd comes from methylalcohol and oxygen, therefore $CH_4O + O = CH_2O + H_2O$. The germicidal action of formaldehyd was first emphasized in 1888 by O. Löw,[*] then by Berlioz,[†] Trillot,[†] and Aronsohn.[‡] According to them it acts powerfully upon living cells, and kills anthrax spores even when greatly diluted. Formalin, as such, according to Stahl,[||] acts in various degrees of solutions upon micro-organisms and upon their permanent spores; it is to be highly recommended on account of its great germicidal action, and on account of its property to become aggressive against the substance of the matter to be disinfected, leaving, however, organic or inorganic matters intact.

Looked at physiologically, formalin converts fresh pieces of normal skin into a leather-like condition. It coagulates the albumen of egg and blood. The former is changed into a transparent mass. Formalin is extensively used as an excellent hardening agent, "in which anatomical preparations maintain their normal appearance."

Formalin is now being used therapeutically in nearly all branches of medicine; in surgical practice, of course, hitherto only to a limited extent, as its disinfecting power, according to Blum, is said not to act quickly enough. In eye diseases Valude[*] and Gessner[†] speak in high terms of a two and one-half per cent. solution.

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[*] Physiologische Notizen über Formaldehyd. *Bericht der Münchener chem. Gesellschaft*, 1888.

[†] Ueber die Eigenschaften der Formalindämpfe. *Gaz. Med. de Paris*, 1892; *Compt. rend.*, cxv, p. 290.

[‡] H. Aronsohn: Ueber die antiseptischen Eigenschaften des Formaldehyds. *Berlin klin. Wochenschrift*, 1892.

[||] Stahl: Ueber Formalin. *Pharmaz. Zeitung*, 1893.

In gynecology Winckel[‡] employed a one-half per cent. formalin solution for irrigation in simple and gonorrheic conditions of the cervix and vaginal mucous membrane, with very satisfactory results. Extensive use of formalin is made for the disinfection of sick and dwelling rooms, of combs, brushes, especially tooth-brushes (Lepkowski), and, according to Hauser,[‖] for the cultivation of bacteria cultures upon gelatin. In the year 1895 Lepkowski[§] published a work upon the employment of formalin in dentistry, in which the author suggests the use of formalin—(1) in acute pulpitis; (2) after the removal of the healthy pulp from the cavity; (3) in incipient periostitis; (4) in cases where the dental pulp exists in complete decomposition; (5) for the disinfection of the tooth-pulp and the tooth-canal before filling, and before the fixing of pivot teeth.

Lepkowski mostly employed forty per cent. formalin solutions in his treatment. In a later work of the same author[¶] it is emphasized that "formalin renders incomparably better services in the conservative method of dental treatment than any of the agents known hitherto."

Unfortunately, there is a cardinal defect attached to this method of treatment. In Lepkowski's and my experience, even with weak solutions of formalin, *such severe* pains were caused to the majority of the patients that this alone, especially with sensitive persons, must amount to *a decided contraindication.* In order to overcome this evil Abraham[**] made the most varied trials, which are described in several dental journals. In root-fillings, instead of the formalin solution, he employed a formalin cement, whose constituents are sulfate of calcium, perchlorid of mercury, sulfuric acid, and formalin, and which is introduced in the same way as the ordinary cements. Abraham's root treatment, therefore, differs from Lepkowski's in this, that the former employs a cement and the latter the liquid. Quite a new factor was introduced by Abraham[††] in his latter report on formalin treatment, when he introduced a formalin cement called *formagen,* which was said to act *painlessly in pulpitis,* and, without further after-treatment, was said to permit a filling after about five minutes. Further reports[‡‡] from other sources speak favorably of formagen. In fact, it seems to me, judging by my experience, that in formagen an agent has been found which gives excellent results in capping exposed hyperemic and acutely inflamed pulps, and is, as regards its mode of action, approaching very closely Miller's ideal.

Miller[‖‖] demands (1) that the agent must be a strong antiseptic; (2) it must be easily soluble, and must diffuse rapidly and well in order to sufficiently saturate all the parts of the pulp; (3) it must not be so easily soluble as to be entirely absorbed by the tissue, and that it disappears in course of time wholly, as, for example, carbolic; (4) a coagulating action upon the pulp appears desirable, but not directly required; (5) the agent must not enter into any combination with the pulp, whereby chemically irritating substances might be formed; (6) it would be desirable that the agent itself used should neither at the time of its application nor afterward exercise an influence upon the root-periosteum; (7) it must not discolor the tooth, which is of especial importance in the case of incisors; (8) hard substances are more suitable than liquids.

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[*] Valude: Formaldehyd als oculares Antisepticum. *Arch. d'Ophthalm.*, 1893.

[†] Gessner: *Centralblatt für die prakt. Augenheilkunde.*

[‡] Winkel: Festschriftzur Feier des 50 jährigen Jubiläums der Gesellschaft für Geburtshulfe und Gynäkologie in Berlin, 1894.

[‖] C. Hauser: Ueber Vermendung des Formalins zur Conservirung von Bakterienkulturen. *München. med. Wochenschrift*, 1893. Real Encyclopädie der gesammten Heilkunde.

[§] Lepkowski: Formaldehyd als therapeutisches Mittel in der Zahnheilkunde. *Verhandlungen der deutschen odontologischen Gesellschaft*. vii bd., Heft. 1 und 2.

[¶] Lepkowski: Ueber Anwendung des Formaldehyds in der Zahnheilkunde. Heft. 3 u. 4 ebenda.

[**] Abraham: Meine Behandlung, pulploser Zähne mittelst Formaldehyd. *Zahnärztliches Wochenblatt*, No. 485; Formalin, No. 462.

[††] Abraham: Formagen, ein zsiverlässiges Mittel um pulpitische Zähne in einer Sitzung zu füllen Zahnarztl. *Wochenblatt.*, No. 486.

[‡‡] Fleischer: Meine Erfahrungen mit Formagen. *Zahnärztliche Rundschau*, No. 452. Maschke: Meine Erfolge mit Formagen. *Odontologische Blatter*, No. 17. Witzig: Formaldehyd. *Schweizerische Viertel-jahrsschrift für Zahnheilkunde*, vii Bd.

[‖‖] Miller: Verhandlungen der deutsch odontolog. *Gesellschaft*, v Bd., Heft iii.

For more than eight months I have applied formagen in all stages of the inflammation of the pulp, and among over three hundred cases only two extractions were necessary afterward. Unfortunately, I had the ill luck to receive in the first lot of formagen a preparation which was too powerfully saturated with the formaldehyd vapors, which naturally caused extremely severe pains, lasting for hours and days. Subsequent lots of formagen I received acted, however, almost painlessly; upon the application of the agent there followed only slight "dragging" in individual cases; periostitic irritation had to be recorded, which disappeared partly spontaneously and partly after treatment. Formagen has given splendid results in two of my own molars, one of which, after repeated but vain treatment, it had already been proposed to sacrifice. I have also to chronicle very good results in a series of pulpitic milk molars; it was applied in children at four years old, and has greatly contributed to the conservation of those teeth which otherwise would have fallen a prey to extraction, as the pulp-treatment with arsenic would in these cases have been out of place.

Thus it appears in formagen an agent has been found—*assuming that it is uniformly prepared, and the troublesome sticking of the cement on the instruments is overcome*—to which must be given the preference before many other medicaments for the treatment of pulpitis. For instance, a patient arrives with severe pulpitic pains; we excavate the carious tooth, the pulp is capped with the soft formagen cement, a filling is placed over it, and the patient, who was so fearful of the "nerve-killing," leaves the operating-room with only slight, or mostly no pain at all. We, on the other hand, have the satisfaction of not having destroyed an organ, as was done hitherto with arsenic, but, faithful to the principles of the healing art, to have preserved the organ which brings life to the tooth,—namely, the pulp, with prospective *lasting* results. With this last I come to the question which every scientifically educated surgeon has a right to put to himself, but which up to the present has remained unanswered,—*How does the formagen act upon the pulp?* Purely empirically and according to the expressed symptoms of the patients, which I am able to confirm by my experiences with my own teeth; formagen, which consists chiefly of carbolic-eugenol and an indifferent porous powder saturated with formaldehyd vapors, stills the pain almost instantly after the agent has been applied to the irritated pulp. Here it is where the well-known anesthetizing action of the carbolic acid takes effect, which arises in this way, that it paralyzes the sensitive nerve-fibers of the pulp; and, furthermore, eugenol, the oxygenous constituent of oil of cloves, also acts as an anesthetic. According to Liebreich,* a local anemia is not produced by the employment of eugenol, as with cocain, but sometimes a painful sensation occurs, which the patient describes as "dragging;" this pain is connected with a rapidly transitory hyperemia. The "dragging," indeed, is very soon felt on the application of formagen; it is, however, partly also to be attributed to the formaldehyd vapors, which develop rapidly and penetrate the pulp, for the more concentrated these penetrate the pulp, the more will the "dragging" rise to a real sensation of pain, as I will show later on. Under the filling which immediately follows, the pulp reacts normally and is sensitive to all injuries, whatever their nature may be, just as in healthy pulps. Now, in order to learn by means of theoretical and more instructive experiment the action of formagen and the changes produced by it in the tissue, I made a series of bacteriological investigations such as were undertaken by Miller,† in his classical work, "Ueber die Mikroorganismen der Mundhöhle," on the pulp with the most varied antiseptics. For this purpose, like Miller, I chose the fleshy pulp of calves' teeth, which pulps, partly whole and partly split, I filled into a small tube which below ended in a pointed orifice. From this fine opening of the small tube, where mostly that part of the pulp came to lie which is situated at the apical foramen, I infected the pulp with bacteria of freshly extracted pulpitic teeth, and applied at the same time at the opposite end of the pulp—

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* Liebreich: Note sur l'anæsthesie locale. *Compt. rend. de la Soc. de Biologie*, 1887, p. 340.

† Miller: Mikroorganismen der Mundöhle.

namely, at its crown portion—the formagen, which I sealed with wadding and wax. The tube was placed with the infected part of the pulp into a reagent glass, which was partly filled with agar-agar culture, and was then deposited in the incubator at the temperature of the body. By this means I was able to observe from without the penetration of the formagen into the pulp, and thus also the process of putrefaction which might perhaps arise.

After one day the reddish pulp was already converted on the surface into a solid, jelly-like structure, which, on the second, third, and fourth days, and so on, became uniformly tough up to the extremest point. The peculiar pungent, formalin odor was completely maintained, and nowhere were processes of putrefaction to be observed. *Macroscopical and microscopical investigations demonstrated that no bacteria were present.* The macroscopical investigations were arranged in such a way that I transplanted the pulps, which were taken out of the small glasses upon plates or saucers with agar-agar culture, and these again were deposited for various periods in the incubator. The plates remained completely sterile, *and hence is proved the extremely powerful disinfecting and antiseptic quality of formagen.*

Another question was,—Does formagen act destructively upon the pulp-tissue, upon its nerves and blood-vessels, or does it conserve them? In order to answer the question, the pulps which had been treated in the manner mentioned above were fixed, and with the microtome sliced into extremely fine longitudinal and transverse sections. For confirmatory trials fresh calves' pulps were converted into pull-preparations and examined microscopically, like the former. The pulp treated with formagen showed, on the whole, the same picture as the normal ones. But with the former the blood was coagulated in all the vessels; the red blood-corpuscles, lying closely against each other, resembled a homogeneous brown-red pillar. The nerves appeared intact. As the blood-vessels had the same appearance also in the finest and most extreme ramifications of the pulp, it is to be assumed that the formaldehyd vapors set free had penetrated the entire pulp. Therefore, the mode of action of the formagen would be as follows: On their application to the inflamed pulp, the carbolic acid and eugenol act first anesthetically; the latter a short time after produces a gentle dragging pain, by increasing slightly the hyperemia present already with the inflammation. Shortly afterward the formaldehyd vapors in the formagen stream gradually through the whole of the pulp-tissue; they kill all pathogenic germs, and convert the pulp *in toto* into a jelly-like homogeneous mass and stasis occurs. While stasis is naturally first formed in the blood-vessels lying nearest to the point of application of the formagen, these vessels receive new blood from below through the apical foramen, whereby the pressure in the vessels narrowed through the stasis—the vessels being full to bursting through the hyperemia already existing in inflammation, and that called forth by the eugenol—becomes so great that a portion of the sanguineous fluid is pressed through the vascular walls. This blood liquid is absorbed greedily by the porous powder contained in the formagen. By this means the vessels, which had severely pressed upon the nerves lying near them through their increased volume and thus caused pain, are relieved of the weight, a new circulation of the blood occurs, and in a short time after the pulp is in a condition to perform its function normally. A preparation, however, too strongly saturated with formaldehyd vapors acts too intensely and violently upon the blood-vessels, the pressure of the vessels, which have become suddenly and violently distended and burden the nerves, becomes over great, and thus perhaps is explained the severe pain, which I have often observed where the formagen has been too much saturated. On the basis of these experiments, I have come to the conclusion that formagen can be recommended with a good conscience as a valuable agent, closely approaching to Miller's ideal. It is not to be used in periostitis, as Abraham has pointed out already.

Finally, I should like to add here that my experiments have brought me to the conclusion that formagen does not influence plastic filling-materials prejudicially.—*Max Bauchwitz, Stettin. (Translated from the Deutsche Monatschrift für Zahnheilkunde, in Journ. British Dental Assoc.)*

Clinical Experience with Formagen.—At the last meeting but one of the Union of Silesian dentists, owing to the favorable results which several colleagues were said to have achieved with formagen, it was suggested that for purposes of further trial of the agent it should be employed at the Dental Institute.

Professor Dr. Sachs, in the course of the last six months, has had formagen used in a series of cases—of course, considering the number of patients at our disposal, only to a limited extent, because, the formagen being a secret agent, he naturally regarded it rather skeptically. I therefore, a few weeks ago, summoned the patients again and took the fillings out, in order to prove in the first place if the pulp was still alive or not, and I am now in a position to place before you the results of seventeen cases—all the patients did not respond to the invitation to call at the Institute.

Before I describe in detail, however, the conduct of the pulps which had been treated with formagen, before and after the treatment, I should like to make a few preparatory remarks, so that we may know what our position is.

As may be gleaned from the literature which has appeared up till now upon the subject, formagen is the name for a formaldehyd cement, whose powder and liquid are said to be saturated with formaldehyd vapors. The liquid consists of carbolic acid and eugenol, the oxygenous constituent of oil of cloves; the powder of indifferent constituents.

The powder and fluid are only weakly impregnated with formaldehyd, and, moreover, above all things, the formaldehyd is said to be set free only gradually, during and after the hardening process. When making an attempt to prove the presence of formaldehyd during hardening, by the sense of smelling, I could not even by warming it demonstrate to myself for certain that the formaldehyd was being set free, whereas the formaldehyd-reaction (reduction of ammoniacal silver oxid solution during heating) followed promptly. There can, therefore, be contained but a very slight quantity of formaldehyd in the agent, for only a five per cent. formalin solution emits still an intensively pungent odor.

Of decisive importance, above all, was the question if formaldehyd would become free already at corporeal temperature, as its effectiveness, on being applied to the pulp, is dependent upon this point. A trial which I made at 37.5° with the mixture of liquid and powder again produced the silver-picture. It may therefore be considered to be an established proof that the preparation contains formaldehyd, and that it becomes free also at the bodily temperature.

Now, if we first turn to the clinical experiences which we have had with the agent, the fact becomes clear that after the application of the formagen in the majority of cases the pains cease almost instantly; and, as you will observe later during the explanations of the individual cases, that afterward in most cases pains have not appeared again, and the pulp has been found alive and capable of reaction. The individual cases were described in our notes as follows:

(1) Augusta A., aged sixteen. On May 4, 1897, there existed slight pulpitis in the left lower second bicuspid. Patient felt pains less through thermal influences than during eating; on contact with an instrument there was reaction through sensation of pain. Formagen and cement filling. The formagen was here, as in all the other cases, ladled upon a paper cap fitted to the size of the cavity, and placed in with very light pressure, so that the formagen was as far as possible distributed uniformly over the floor of the cavity.

In order to avoid repetition, I must mention in advance that in all the experiments after the removal of the filling, mechanical contact, cold carbolic spirit, cold and warmed air were tried in order to prove if the pulp had the power of reaction.

The pulp in this case reacted on October 4, 1897, normally; when, unintentionally, pressure was exercised with the excavator it resulted in a moderately severe spasm of pain. After the filling of the tooth the patient experienced no pains. Formagen and cement filling.

(2) Anna Sch., aged twenty-nine. On May 4 exposed pulp slightly reddened; on contact, as also under thermal influences, pains were felt. Formagen and cement filling.

On October 14, 1897, the patient stated that during the first two months after the filling she felt nothing at all, and then with changes of temperature she experienced a slight drawing pain. The pain exhibited normal reaction. After plugging with a carbolic cap and cement filling, cold water did not affect her.

(3) Augusta B., aged twenty. On May 4 she had felt in the left lower first molar for some considerable time moderately severe pulpitic pains. Formagen and cement filling.

As on October 13, 1897, after the removal of the filling, sensitiveness could not be annulled, I opened the pulp-cavity. The root-pulp was found to be still alive; the extirpation was rather painful. Root filling, copper amalgam. The patient did not feel any pains after the first filling of the tooth.

(4) Paul R., aged twelve, May 4, 1897. As the process of excavating was very painful, although the pulp appeared to be intact, we capped it with formagen, and sealed the cavity with a duplicated filling.

On October 12, 1897, there still exists sensitiveness of the dentin during the attempt to excavate, without, however, being too painful. Patient had had no pains in the period between.

(5) Hans H., aged twelve. On May 4 the pulp in the right upper lateral, which was very sensitive, was treated with formagen and cement filling.

On October 14, 1897, the patient reported that the filling had dropped out four weeks earlier; on the application of carbolic spirit and of the air current there was no sensitiveness, only slight pain on contact with the probe.

(6) Fräulein G., aged twenty. On May 6, 1897, the patient had for some time felt pains in right upper central; latterly day and night. The pulp during excavation was shown to be exposed two mm., strongly reddened. Thermal influences and contact produced great sensitiveness. Formagen and cement filling.

October 14, 1897. Patient, on influences of temperature, felt a dragging. After the filling was removed the canal was observed to be open, and only after the probe was pushed some two to three mm. in the canal could the pulp be touched, which reacted by sensitiveness to the touch. Carbolic spirit and air are only slightly felt. Carbolic capping and cement filling.

(7) Pauline K., aged fifty-three, May 6, 1897. The pulp in the right upper lateral was transparent and sensitive to contact. Spontaneous pains had not yet been felt. Formagen and cement filling.

October 15, 1897. Patient has not had any pains. The pulp was found to be normally capable of reaction. Cement filling.

(8) Marie M., aged twenty-two, May 14, 1897. The pulp in the right upper central incisor is exposed, but is little sensitive. Patient has not yet felt any pains, and does not experience much during excavation. Formagen and cement filling.

Here, also, after the removal of the filling on October 13, the canal was open, and the probe had to be pushed up one to two mm. ere it touched the pulp, and caused it to react. Against cold air and carbolic spirit it was unresponsive. Patient had not felt any pains.

(9) Hermine S., June 16, 1897. Patient had felt slight pains in left upper first molar; at night they had not yet appeared; for two days they were quite absent. Formagen and cement filling.

On October 15 the pulp reacted at the touch, while the sensitiveness against air and carbolic spirit appeared somewhat blunted. Duplicated filling.

(10) W. V. T., July 5, 1897. Patient during the last two days felt severe pains, which occurred spontaneously, and lasted also during night time. Formagen and cement filling.

On October 14. The pulp is normally sensitive. Patient had had no pains of any sort. Copper amalgam.

(11) Anna K., July 15, 1897. Patient for some time has felt pains in left upper second molar. In excavating the pulp is laid bare. Formagen and cement filling.

October 14. The pulp exhibits moderately normal sensitiveness. The patient had had no pains.

(12) Ida Z., July 21, 1897. Patient, in consequence of severe pains in left upper third molar, had spent a sleepless night. Formagen and cement filling.

On October 15 the patient reported that on the morrow of the filling of the tooth she still had had pain, but since that time had been free from pain. The pulp was alive, but exhibited, on the application of different test methods, slighter sensitiveness than in the normal condition.

(13) Marie H., aged thirty, June 18, 1897. Pulp in right upper central just showing through, and very sensitive to cold and warm water. Formagen and cement filling.

October 15. Patient has not had any pains; the pulp reacts in a normal manner.

In the four following cases, owing to want of time, the fillings could not be taken out, and therefore it was endeavored to produce a reaction of the pulp by applying a hot instrument in the vicinity of the neck of the tooth.

(14-15) Meta M., May 15, 1897. In the case of this patient there existed in right lower first bicuspid slight pulpitis, and in the third lower molar the pulp was laid bare. In both cases the cavities were filled with formagen and cement fillings.

On October 15 the patient experienced in both teeth a very lively disagreeable dragging on contact with the hot instrument.

(16) Alma H., June 14, 1897. Exposed pulp in right lower first molar; pain had not yet arisen spontaneously. Formagen and copper amalgam filling.

October 19. Patient has had no pain. On touching with a very hot instrument she feels a slight dragging sensation.

(17) George H., aged thirteen, May 3, 1897. Pulp of first molar slightly exposed; pain upon thermal or mechanical actions. Formagen and amalgam filling.

On October 16 the tooth reacts upon a hot instrument being applied, causing lively pain; violent jactitation of the patient. After the treatment the patient felt no more pain.

How we are to imagine the mode of action of the preparation I cannot for the present decide; especially, as with the triple number of the antiseptics which is contained in the formagen it would be difficult to say to which of the three antiseptic agents must be ascribed the action. Nevertheless, experiments on animals and the microscope may be able to throw some light, especially also upon the question as to what changes take place in the inflamed pulp under the influence of the formagen, and if and in what manner there is healing.

The answer to this important question has up to the present not been found, for a theory set up by Bauchwitz in the July number, 1897, of the *Deutsche Monatschrift für Zahnheilkunde* is so impossible that I will not deal with it more particularly.

A healing in the real sense of the word, a *restitutio ad integrum*, appears to me from the clinical experiences to be excluded; at all events, in most of the cases the reduced sensitiveness, and above all a retraction observed in two cases, and the destruction of the crown-pulp in the one instance, speak against it. In the latter case it might be assumed that perhaps the formagen was not laid in without avoidance of all pressure, and that hence the death of the pulp had been brought about. Against this, however, goes the fact that the patient in question did not feel any pains after the filling.

If it were not idle to set up a theory, without having to some extent a positive basis for it, one might imagine, analogous to other similar processes, the mode of action of the formagen and the healing of the pulp in this way: That a superficial cauterization of the pulp takes place, and that the inflamed tissue is thereby destroyed; the scab of the cauterization serves as a protection to the pulp, which, perhaps, bears it off by means of a demarkating inflammatory process. The slight sensitiveness, the seeming retraction of the pulp, might, no doubt, be explained in this way. A final judgment on the value of this agent cannot, of course, be yet passed after these experiments, for, in the first place, the period of observation is a relatively short one, and we must wait to see if the pulp is not gradually destroyed; secondly, above all things, I cannot bring forward positive reasons for the changes which the pulp enters into. Nevertheless, we are justified by the clinical experiences gained to undertake more extended trials.—*Alfred Kunert. (Translated from the Deutsche Monatschrift für Zahnheilkunde, in Journ. British Dental Assoc.)*

NITROUS-OXID ANESTHESIA.—This communication* is the result of investigations begun by Dr. Kemp in 1890, conjointly with Dr. E. W. Brush, of Brooklyn, N. Y., and finally completed at the Johns Hopkins University in 1897.

Dr. Brush had been convinced by his experience of the use of nitrous-oxid gas mixed with air in major surgical operations that this anesthetic does not produce its influence simply by depriving the patient of oxygen.

The following experiments were undertaken to prove its specific anesthetic influence as distinct from that of an indifferent gas such as nitrogen. Fourteen observations were made comparing the symptoms exhibited under inhalations of nitrogen and also of nitrous-oxid gas. Two points came prominently into notice: (1) the anesthesia was induced sooner with nitrous oxid than with nitrogen, and (2) the muscular movements which always supervene on deprivation of oxygen were milder under nitrous oxid than under nitrogen.

A second series of experiments upon dogs in which, after the introduction of a tracheal canula connected with two rubber bags containing respectively nitrous-oxid gas and nitrogen, sufficient air was admitted through a small opening to prevent marked symptoms of asphyxia.

Under the nitrous oxid and air a dog remained smoothly anesthetized even to the extent of standing the stimulation of a sensory nerve without signs of pain; but when nitrogen was substituted, the amount of air remaining the same, the dog gradually came out of his anesthesia and regained consciousness.

Paul Bert's classical experiments with nitrous oxid under pressure in an air-tight operating room are also referred to, and it is pointed out that when the patient breathed a mixture of eighty per cent. nitrous oxid and twenty per cent. of oxygen and was deeply anesthetized, the surgeon and his assistants, who were inspiring eighty per cent. of nitrogen and twenty per cent. of oxygen (atmospheric air), were not affected.

Remarking upon the success of Paul Bert's anesthesia with this agent under increased pressure for prolonged operations, and the great safety of nitrous-oxid gas as devienced by its almost inappreciable mortality, Dr. Kemp shows that its more general use for such work at ordinary pressure hinges on the question: Can the blood carry enough nitrous oxid to anesthetize the patient and at the same time carry enough oxygen to support life without danger?

By a further series of very ingenious researches, involving the administration of nitrous oxid and air and nitrous oxid with oxygen in differing percentages, and the subsequent estimation of the resulting percentage of oxygen and other gases in the blood of the animal drawn during deep anesthesia from its femoral artery, Dr. Kemp arrives at the conclusion that "anesthesia deep enough to prevent pain on stimulating a sensory nerve is obtained in most instances when the blood is carrying about 8.5 per cent. of oxygen, that the minimum is about 7.9 per cent., and that in some cases we get perfect anesthesia with as high a percentage of oxygen as 16.8. This latter figure is practically within the limits of the amount of oxygen normally present in the blood, and precludes the supposition of asphyxia. The lowest amount of oxygen obtained (7.9 per cent.) is just about the boundary where changes of metabolism begin to be induced, but is well within the safety limit." Mention is then made of the work of Loewy and Mutz, of Berlin, and of Terray, who all agree that at any rate with a percentage of oxygen below 5.25 in the inspired gas, metabolism is more or less seriously affected by a prolonged inhalation.

In Paul Bert's experiments an animal lived one hour and twenty-three minutes breathing to and fro from a bag containing nitrous-oxid gas with 6.7 per cent. of oxygen.

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* A paper read at the meeting of the British Medical Association, at Montreal, 1897, by G. T. Kemp, M D., Ph.D.

Dr. Kemp found that he was unable to obtain a compound of nitrous oxid with the hemoglobin of the blood, and that the spectrum of oxyhemoglobin was always present in the blood drawn, as described in his experiments. The action of nitrous oxid upon the heart was found to produce a beat slightly stronger and slower than when the animal was breathing nitrogen with the same amount of air; but on being tested there was no appreciable effect upon the blood-pressure.

The eyelid-reflex was found to be persistent, and was not abolished in the animals under experiment with nitrous-oxid gas and air, or oxygen: Dr. Kemp, therefore, believes that the gas acts most powerfully upon the central nervous system, especially affecting the cerebral cortex, and not so much upon the end organs in the conjunctiva and elsewhere.

With regard to the general metabolism, one result of these researches is to show positively that $CO_2$ in the arterial blood is greatly diminished, and is never increased, so that any theory involving the dependence of anesthesia on a retention of $CO_2$ within the system is in opposition to the direct findings of the experiments.—H. BELLAMY GARDNER, in *Journal of British Dental Assoc.*

A LOW FUSIBLE METAL.—Bismuth, 48 parts; cadmium, 13 parts; tin, 19 parts. This melts below the boiling point of water, and is very hard. It melts at so low a temperature that it can be packed with the fingers. A common plaster impression can be poured at once without waiting for it to dry.—*Brit. Journ. Dental Science.*

## HINTS, QUERIES, AND COMMENTS.

ELECTRICITY IN DENTISTRY.—The article by Professor C. S. Neiswanger in the January number of the DENTAL COSMOS, although presenting some considerations of interest to dentists in connection with the uses of electricity in dentistry, likewise contains much that is misleading, not to say incorrect.

It is but too true that the knowledge of electricity possessed by the generality of dentists is exceedingly limited; but if they are to be given instruction in the subject, from whatever source derived, it should, above all things, be trustworthy and not open to doubt on the score of reliability. Absolute accuracy of statement is of the utmost importance in scientific dissertations, even if those addressed be entirely without information on the subject-matter under consideration.

With due respect for Professor Neiswanger's standing as a physicist, and his endeavor to enlighten our profession on the correlation of the forces of nature, it may be well to point out that the ether is not electricity, nor will it conduct sound. Although the vibration frequencies in the aforementioned ether are somewhat high, that is no reason why the periodicity of the red waves of light should be stated one million times too low.

Without wishing to trespass too much upon your valuable space, and pausing only to record my disapprobation of such expressions as "amperage is electricity or current," I cannot refrain from correcting a very singular error into which my friend has fallen.

In attempting to prove the superiority of graphite over German-silver resistances in cataphoric work, the statement is made that, as all metals show an increase of resistance with increase of temperature, the use of German silver is not to be recommended, because, after it becomes heated, the intensity of the current to which the patient is subjected is reduced to such an extent that it is almost impossible to obtain that gradual increase which is desired.

This statement is incorrect for two reasons:

In the first place, the temperature coefficient of German silver is exceedingly small, being only .0004433 per degree Centigrade; so that, even if the temperature of the wire were to rise 100 degrees Centigrade, the increase of resistance would be only .04 per cent. To illustrate: If the resistance of a certain piece of German-silver wire were 150 ohms at the melting-point of ice, and the temperature were to rise to the boiling-point of water, the resistance of the wire would be 156.65 ohms, showing a proportionately small increase.

In the second place, if the German-silver rheostat were so poorly made (insufficiency of carrying capacity or otherwise) as to rise unduly in temperature, an increase of resistance in the German-silver wire would produce just the opposite effect to that stated,—*i.e.*, it would cause a slowly increasing current through the patient, who is placed in a circuit shunting more or less of the resistance, whether of German silver or graphite. That portion of the German-silver wire external to the portion shunted by the patient would rise very slightly, but the rise would be inappreciable, because of the high resistance in series with it, lamps, etc.

The effect of an increase in the resistance of the portion shunted by the patient is quite different. If two currents be in parallel, and the total current passing through them be constant in strength, an increase of resistance of one of the currents causes a corresponding increase of current in the other, while a decrease of that resistance produces a decrease of current in the second circuit.

The changes of current strength in a circuit caused by shunting it are much more pronounced than those resulting from inserting resistance directly in that circuit.

In following temperature changes, therefore, the only portion of the resistance we need consider is that internal to the patient's circuit; that is, in parallel with it.

Bearing this in mind, it will be seen that if the resistance of the German silver increase because of a rise in temperature, a steady increase of current strength in the patient's circuit is the result, while, for the same reason, the precisely opposite effect takes place if graphite be used as resistance.

My experience has been that German silver is vastly superior to graphite, as the uncertainty of contact of the latter and the liability of its surface to damage by handling, and the accumulation of dust and dirt upon it, make it, from an electrical point of view, a decidedly unsatisfactory substance to work with. For this reason it is chiefly used as a means of dissipating electrical energy, or as a regulator for such circuits as those supplying current to arc lamps.

German silver, on the other hand, because of its high specific resistance, its low temperature coefficient, and its immunity from change of condition due to oxidation and kindred causes, is an exceedingly valuable alloy, and is consequently universally employed by instrument-makers in manufacturing standards of resistance.—J. E. KEEFE, Chicago, Ill.

MUMMIFYING PASTE.—In the *British Journal of Dental Science*, February 15, 1898, Montagu F. Hopson, L.D.S., publishes a tabulated report of fifty consecutive cases of devitalized teeth treated with mummifying paste.

The formula used is a modification of that originally recommended by

Söderberg in the Dental Cosmos for May, 1896, and is as follows: ℞—Alum ust., thymol, glycerol, āā ʒj; zinci oxid. *q. s.*

The plan of procedure was the same throughout, the pulp having been devitalized by the agency of Baldock's Paste and all moisture excluded, whenever possible, by the use of the rubber-dam. The pulp-chamber was opened by a sterilized bur and its contents cleared away, no attempt being made to remove the pulp from the canals. The pulp-chamber was washed out with a solution of corrosive sublimate in alcohol, gr. ij to ʒj. Enough of the mummifying paste to completely fill it was then introduced into the pulp-chamber and pressed home with a pledget of cotton wool held in the conveying forceps. The whole was sealed with Harvard Cement, and the filling completed with material suitable to the cavity.

The period during which the operations were made extended from December 3, 1895, to September 25, 1897. The longest time during which any of them had been under observation was about one year. All had been comfortable afterward with the exception of two, which gave evidence of some pericemental trouble immediately after treatment, and which quickly subsided under applications of iodin. One developed pericemental irritation during an attack of influenza, but quickly subsided under iodin treatment. The remaining forty-seven gave no discomfort whatever.

The teeth treated were first and second molars with the exception of three, which were bicuspids.

# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

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The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

**Beuf** (Antoine.) Des troubles fonctionnels consécutifs à l'amputation totale de la langue résultats de la prothèse linguale. Par., 1897, 75 p. 8°.*

**Blary** (Raymond.) Contribution à l'étude des gommes syphilitiques des Paupières. Lyon, 1897, 71 p. 8°.*

**Gautier** (Louis.) Traitement de la syphilis laryngée en particulier des stenoses laryngées par le tubage. Lyon, 1897, 140 p., 1 pl. 8°.*

**Gorgas** (F. J. S.) Dental medicine; a manual of dental materia medica and therapeutics. 6th ed., revised and enlarged. Phila., 1898, P. Blakiston, Son & Co., 592 p. 8°.

**Hirschfeld** (William.) Étude sur la carie dentaire et son traitement par le plombage. Par., 1898, J. B. Baillière et fils, 47 p. 8°.

**Koerner** (Hans.) Uber die Beziehungen der Erkrankungen der Zähne zu den chronischen Schwellungen der regionären Lymphdrüsen. Experimentelle und Glinische Arbeit. Berl., 1897, J. Guttentag, 58 p. 8°.

**Krause** (H.) Die Erkrankungen der Singstimme, ihre Ursachen und Behandlung. Berl., 1898, A. Hirschwald, 32 p. 8°.

**Lavrand** (H.) Les angines glanduleuses. Par., 1898, Rueff & Cie., 235 p. 12°.

**Maire** (E.) L'erosion dentaire. Par., 1898, J. B. Baillière et fils, 76 p. 8°.

**Marshall** (J. S.) A manual of the injuries and surgical diseases of the face, mouth and jaws. Phila., 1897, S. S. White Dent. Mfg. Co., 732 p. 8°.

**Martinier** (P.) Clinique de prothèse; prothèse dentaire, prothèse orthopédique, prothèse des maxillaires. Par., 1898, J. B. Baillière et fils, 340 p. 12°.

**Reed** (Charles B.) A quiz manual of histology, general and dental. Chicago, 1897, W. T. Keener Co., 203 p. 16°.

**Transactions** of the dental society of the state of New York; twenty-ninth annual meeting, Albany, N. Y., May, 1897. Albany, 1897, 180 p. 8°.

**Zahnkunst** (Die.) Wochenschrift des Vereins Deutscher Zahnkünstler. Redakteur: Th. Arthur Stolper. v, 1–2, 1897–8. 4°. Breslau, 1897–8.

**Zahntechnische** Rundschau. Zentral-Organ für die beruflichen Interessen des gesamten Zahnkünslerstandes. Verantwortlicher Redakteur: G. H. Pawelz. Jahrg. 1898. 4°. Berlin, 1898.

**Adjusting** the rubber-dam with the Ivory clamps. Dental Brief, Phila., 1897–8, ii, 513–515.—**Albert** (H. L.) The sulpho-cyanide of potassium in saliva. Brit. J. Dent. Sc., Lond., 1898, xli, 241–251.—**Alexander** (A.) Histologische Beiträge zur Lehre von den gutartigen Neubildungen der Stimmlippen. Arch. f. Laryngol. u. Rhinol., Berl., 1898, vii, 239–271.—**Alexander** (L.) Beitrag zur Kenntnis der Wahren Ankylose des Kiefergelenks. Beitr. z. klin. Chir., Tübing., 1898, xx, 681–726.—**Allan** (G. S.) Treatment of pulpless teeth with hydrogen dioxide, ethereal solution. Internat. Dent. J., Phila., 1898, xix, 201–206.—**Arnold** (D. S.) Treatment of fractured maxillaries. Dental Digest, Chicago, 1898, iv, 155–159.—**Arrington** (B. F.) Controversies in relation to pyorrhea alveolaris. Items Interest, N. Y., 1898, xx, 241–244.—**Ault** (M. F.) The dentist in his non-professional relation. Indiana Dent. J., Indianap., 1898, i, 319–331.—**B.** (W. G.) Obstinate hæmorrhage. Dominion Dent. J., Toronto, 1898, x, 83.—**Babcock** (W. L.) Hemilingual atrophy with coexisting bulbar symptoms associated with insanity other than general paralysis. Med. Rec., N. Y., 1898, liii, 446.—**Barbour** (P. F.) Rachitis, or rickets. Dental Pract., Buffalo, 1898, xxix, 64–67.—**Bardach** (H.) Einige Bemerkungen zur Technik der approximalen Amalgamfüllungen in Frontzähnen. J. f. Zahnheilk., Berl., 1898, xiii, no. 12. ——— *Also:* Oesterr-ungar. Vrtljschr. f. Zahnh., Wien, 1898, xiv, 99–112.—**Baumgärtel** (G.) Schusswunden der rechten Gesichtsfläche mit Fractur des rechten Oberkiefers. Ztschr. f. Wundärzte u Geburtsh., Fellbach, 1898, xlix, 48–54.—**Beatson** (G. T.) [Three cases of epithelioma lingualis.] Glasgow M. J., 1898, xlix, 198–202.—**Bickel** (O.) Iodoformagen cement. Items Interest, N. Y., 1898, xx, 244–246.—**Bidone** (E.) Angioma della glandola parotide; contributo clinico ed anatomo-patologico alla conoscenza dei tumori rari della parotide. Arch. di ortop., Milano, 1897, xiv, 398–406; 1898, xv, 16–24, 1 pl.—**Biro** (S.) Ueber die prädisponirenden Ursachen der Caries mit besonderer Berücksichtigung der Untersuchungen Black's und William's. Oesterr-ungar. Vrtljschr. f. Zahnk., Wien, 1898, xiv, 77–93.—**Black** (G. V.) The welding property of gold, with demonstration. Dental Rev., Chicago, 1898, xii, 278–284. ——— Instrument nomenclature with reference to instrumentation. Dominion Dent. J., Toronto, 1898, x, 73–81.—**Bönnecken** (H.) Ueber neuere Methoden in der Behandlung erkrankter Pulpen. J. f. Zahnheilk., Berl., 1898, xiii, no. 9; no. 10. ——— *Also:* Oesterr-ungar. Vrtljschr. f. Zahnk., Wein, 1898, xiv, 1–19.—**Boettiger** (A.) Die Therapie der Trigeminusneuralgie. Mitt. a. d. Grenzgeb. d. Med. u. chir., Jena, 1897, ii, 788–798.—**Boice** (Alonzo.) Obituary. Internat Dent. J., Phila., 1898, xix, 258.—**Bolam** (R. A.) Antral carcinoma. J. Path. & Bacteriol., Edinb. & Lond., 1898, v, 65–68, 2 pl.—**Branigan** (E.) The need of dental instruction in medical schools. J. Am. M. Ass., Chicago, 1898, xxx, 979.—**Briegleb** (K.) Für Schleich! Med.-chir. Centralbl., Wien, 1898, xxxiii, 11–14.—**Brodtbeck** (A.) Gestanzte Metallkauflachen beim niederer Artikulation. Schweiz, Vrtljschr. f. Zahnh., Basel u Genève, 1898, viii, 76, 1 pl.—**By-laws** of the dental society of the state of New York. Tr. Dent. Soc. N. Y., 1897, xxix, 42–49.—**Capon** (W. A.) Bicuspid porcelain jacket crowns. Dental Brief, Phila., 1897–8, ii, 515–519.—**Carpenter** (E. R.) Syphilis from a dental standpoint. Dental Rev., Chicago, 1898, xii, 272–278.—**Cartaz** (A.) Une variété d'abces chroniques du voile du palais. Rev. internat. de rhinol., otol. et largyngol., Par., 1898, viii, 127–131.—**Chance** (A. W.) Treatment of the dental pulp. Pacific Medico-Dent. Gaz., San Fran., 1898, vi, 121–124.—**Chase** (Henry S.) [1820–1898.] Obituary. Internat. Dent. J., Phila., 1898, xix, 258.—**Crouzillac.** Amygdalite linguale phlegmoneuse. Rev. hebd. de laryngol. [etc.], Par., 1898, xviii, 369–392.—**Curtis** (G. L.) Reproduction of tissue. Dominion Dent. J., Toronto, 1898, x, 121–123.—**Dalma** (D.) Naturähnliche Zahnkronen. Oesterr-ungar. Vrtljschr. f. Zahnk., Wien., 1898, xiv, 94–99.—**Danlos.** Perforation syphilitique précoce de la voûte palatine. Bull. Soc. franç. de dermat. et syph., Par., 1898, ix, 92.—**D'Argent.** The action of arsenious acid on the dental pulp. Brit. J. Dent. Sc., Lond., 1898, xli, 193–197.—**Didsbury** (G.) Hypertrophie chronique de l'amygdale linguale et troubles réflexes. France méd., Par., 1898, xlv, 194–196.—**Dominguez Adame** (M.) Caries dentaria: flegmón consecutivo de la región del carrillo; rotura del conducto de Stenon; fístula salival; curación espontánea de la fistula. Rev. med. de Sevilla, 1896, xxvii, 290–294.—**Dowd** (C. N.) The method of operating for small epitheliomata of the lip. Med. Rec., N. Y., 1898, liii, 443–445.—**Duddy** (W. H.) Are dental students properly educated. Dental Digest, Chicago, 1898, iv, 159–161.—**Einthoven** (W.) Ueber die Bewegungen des Pharynx. Bemerkungen zu einigen stereoskopischen Momentaufnahmen. Internat. phot. Monatsch. f. Med. [etc.], Düsseld., 1898, v, 17–19, 2 pl.—**Ellwood** (F. H.) A simple and inexpensive crown, bridge and block furnace. J. Brit. Dent. Ass., Lond., 1898, xix, 170.—[**Enforcement** of the dental law, and proposed legislation.] Tr. Dent. Soc. N. Y., 1897, xxix, 10–15.—**Escat** (E.) Eclairage par contact du sinus maxillaire ou éclairage rétromaxillaire. Rev. internat. de rhinol., otol. et laryngol., Par., 1898, viii, 119–126.—**Farrar** (J. N.) Some points in the differential diagnosis of protruding lower teeth, with brief suggestions upon the treatment for their correction. Tr. Dent. Soc. N. Y., 1897, xxix, 131–136.—**Ferreri** (G.) Rapport sur la valeur de l'autoscopie dans le diagnostic et le traitement des affections laryngées. Ann. d. mal. de l'oreille, du larynx [etc.], Par., 1898, xxiv, 259–261.—**Foster** (H.) Adenoid growths in the vault of the pharynx, and their relation to diseases of the middle ear. J. Ophth., Otol. & Laryngol., N. Y., 1898, x, 32–36.—**Fraenkel** (A.) Zur Technik der Operation des Mandelkrebses. Wien. klin. Wchnschr., 1898, xi, 291–293.—**Frink** (L. F.) Some causes of failures in operative dentistry. Dental Reg., Cincin., 1898, lii, 171–174.—**Furet.** Un cas de molluscum pendulum de l'amygdale. Rev. internat. de rhinol., otol. et laryngol., Par., 1898, viii, 126.—**Gevaet** (C.) Les tumeurs du voile du palais. Belgique méd., Gand-Haarlem, 1898, i, 385–388.—**Gibney** (V. P.) Nitrous oxide and ether for anæsthesia. Med. Rec., N. Y., 1898, liii, 457–459.—**Gillett** (H. W.) Cataphoresis. Tr. Dent. Soc. N. Y., 1897, xxix, 137–156.—**Godon et Contremoulins.** Des applications de la radiographie et de la radioscopie en art dentaire. Odontologie, Par., 1898, 2. s., vi, 141–152, 1 pl.—**Gradenigo** (G.) Rapport sur l'hyperplasie de l'amygdale pharyngée (végétations adénoïdes). Ann. d. mal. de l'oreille, du larynx [etc.], Par., 1898, xxiv 261–268.—**Green** (G. W.) Report of one thousand consecutive anesthesias; observed in the service of Dr. A. J. Ochsner at Augustiana Hospital. Chicago M. Recorder, 1898, xiv, 218–226.—**Grosheintz** (E.) Buchführung für Zahnarzte. Schweiz. Vrtljschr. f. Zahnh., Basel u. Geneve, 1898, viii, 60–70, 1 pl.—**Grünbaum** (O. F. F.) The effect of resistance to secretion upon the percentage of salts in saliva and upon the work done by the gland. J. Physiol., Lond., 1898, xxii, 335–390.—**Guinard** (U.) Du traitement de la névralgie du trijumeau par les procédés opératoires économiques; procédé de M. le Pr. Le Dentu pour la résection du nerf maxillaire supérieur. Arch. gén. de méd., Par., 1898, i, 309–318.—**Haderup** (V.) Aeltere und neuere Behandlung der Gaumenspalte (palatum fissum congenitum). Med.-padagog. Monatschr., Berl., 1898, viii, 33–42.—**Halphide** (A. C.) Suggestive therapeutics. Dental Rev., Chicago, 1898, xii, 288–294.—**Harlan** (A. W.) Some thoughts on alveolar abscess. Dental Rev., Chicago, 1898, xii, 268–271.—**Hartmann** (H.) Calculs salivaires extraits du canal de Wharton, par M. le Dr. Loison. [Rap.] Bull. et mém. Soc. de chir. de Par., 1898, n. s., xxiv, 165–171.—**Haskell** (L. P.) Forty-six years of continuous gum. Dental Rev., Chicago, 1898, xii, 286.—**Hattyasy** (L.) Versuche über die Frage der Sterilität unter Füllungen cariöser-Zähne bei Anwendung verschiedener Verfahren und Füllengsmaterialien. Oesterr-ungar. Vrtljschr. f. Zahnk., Wien, 1898, xiv, 48.—**Himmelsbach** (G. A.) A molar tooth in the left bronchus for six months; recovery. Dental Pract., Buffalo, 1898, xxix, 57–60.—**Hubbard** (D. L.) Immediate and remote causes of the malformation of the dental arch. Dental Cosmos, Phila., 1898, xl, 270–276.—**Hugot.** Œsophagotomie externe pour l'extraction d'un dentier. Lyon méd., 1898, lxxxvii, 300.—**Jameson** (A.) Amalgam. Indiana Dent. J., Indianap., 1898, i, 308–313.—**Johnson** (H. H.) Dental education. South. Dent. J., etc., Macon, 1898, xvii, 81–84.—**Jousset et Frouchaud.** Extirpation extemporanée par la bouche, d'un fibrome naso-pharyngien (méthode de Doyen). Echo méd. du nord., Lille, 1898, ii, 128–131.—**Kilian** (J.) Entwicklungsgeschichtliche anatomische und klinische Untersuchungen über Mandelbucht und Gaumenmandel. Arch. f. Laryngol. u. Rhinol., Berl., 1898, vii, 167–203, 3 pl.—**Kimball** (C. O.) The method of using soft gold-foil as practised and taught by Dr. Dunning. Internat. Dent. J., Phila., 1898, xix, 211–216.—**King** (G.) A case of so-called recurrent or chronic abscess of the soft palate. Laryngoscope, St. Louis, 1898, iv, 224–228.—**Kirk** (E. C.) A dental anomaly. Dental Cosmos, Phila., 1898, xl, 281–285. ——— Some phases of the educational problem. Dental Pract., Buffalo, 1898, xxix, 49–57.—**Kirstein.** Der Zungenspatel. Berl. klin. Wchnschr., 1898, xxxv, 255–257.—**Knight** (W.) Tumors of the maxilla. J. Am. M. Ass., Chicago, 1898, xxx, 727.—**Koninski** (K.) Einige Mängel in unseren Kenntnissen über die Maul-und Klauenseuche. Oesterr. Monatschr. f. Thierh., Wien, 1898, xxii, 97–121.—**Krause** (F.) Die chirurgische Behandlungen der Trigeminusneuralgie. Mitt. a. d. Grenzgeb. d. Med. u. Chir., Jena, 1897, ii, 767–787.—**Le Fort** (R.) Angiome des gencives. Bull. Soc. anat. de Par., 1898, lxxiii, 122.—**Libby** (H. F.) A method of inserting gold fillings with the use of hand burnishers, as practiced exclusively for twenty years. Dental Cosmos, Phila., 1898. xl, 276–281.—**Lichtwitz.** Acute Osteomyelitis des Oberkiefers ein sogenanntes "klassisches" Empyem der Highmors-Höhle simulirend. Arch. f. Laryngol. u. Rhinol., Berl., 1898, vii, 439–442.—**Loeffler und Frosch.** Berichte der Kommission zur Erforschung der Maul-und Klauenseuche bei dem Institut für Infektionskrankheiten in Berlin. Centralbl. f. Bakteriol. [etc.], 1. abt., Jena, 1898, xxiii, 371–391.—**Lowe** (C. B.) Hygiene of the teeth. Am. J. Pharm., Phila., 1898, lxx, 191–195.—**Luc** (H.) Une nouvelle méthode opératoire pour la cure radicale et rapide de l'empyème chronique du sinus maxillaire. Rev. internat. de rhinol., otol. et laryngol., Par., 1898. viii, 158–168.—**Lydston** (G. F.) Antipyrin as a local anæsthetic. Med. Rec., N. Y., 1898, liii, 501.—**Lyons** (C. J.) The methods of using gold and tin together. Dental Reg., Cincin., 1898, lii, 166–168.—**McGovern** (E. E.) Dental ethics. Dominion Dent. J., Toronto, 1898, x, 117–120.—**Martin** (C.) Nécrose partielle du cricoïde due au séjour prolongé d'une sonde œsophagienne chez un malade apéré d'un cancer de la langue. Bull. Soc. anat. de Par., 1898, lxxiii, 123.—**Martinier** (P.) Appareil a double traction pour correction du prognathisme du maxillaire supérieur. Odontologie, Par., 1898, 2. s., vi, 185–189, 1 pl. ——— Un cas de prothèse restauratrice du maxillaire inférieur. *Ibid:* 189–191, 1 pl.—**Meade** (C. M.) My method of taking a bite, showing a model. Indiana Dent. J., Indianap., 1898, i, 299–308.—**Mills** (W. A.) Pathologic conditions of the pharynx and contiguous structures during early childhood, prime factors in the etiology of malformed maxillæ and irregular teeth, etc. J. Am. M. Ass., Chicago, 1898, xxx, 980.—**Moeser** (E.) Dauernde Drainage der Kieferhöhle durch eine un einer Brücke befestigte Canüle. Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 117–119.—**Molyneaux** (G.) A clinic on a fusible alloy. Ohio Dent. J., Toledo, 1898, xviii, 161–164.—**Mongour** (C.) De la non existence d'une stomatite distincte et spécifique dite stomatite diphtéroïde. Presse méd., Par., 1898, i, 154–156.—**Morgan** (J. H.) Euthymol. Items Interest, N. Y., 1898, xx, 248.—**Müller** (E.) Goldkronen, Kapselstiftzähne und abnehmbare Brückenarbeiten. Oesterr.-ungar. Vrtljschr. f. Zahnk., Wien, 1898, xiv, 112–126. ——— Zahnärztliche Kryptographie. Schweiz. Vrtljschr. f. Zahnh., Basel, 1898, viii, 57–60, 2 l.—**Muntz** (E.) The University extension system. Dental Pract., Buffalo, 1898, xxix, 60–63.—**Murray** (R. W.) Hare-lip and cleft palate. Liverpool M.-Chir. J., 1898, xviii, 194–197, 3 pl.—**Negro** (O.) Paralisi nevritica unilaterale dell' ugola e del palato molle in un caso di tabe dorsale; risultato terapeutico ottenuto mediante eccitamenti. Boll. d. Policlin., Torino, 1898, iii, 15; 25.—**Niemeyer** (H.) Ueber die zufällige und die beabsichtigte Entfermung von Zahnkeimen bleibender Zähne. Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 153–172.—**Page** (G. W.) Operative orthodontia. Ohio Dent. J., Toledo, 1898, xviii, 173–176.—**Peirce** (C. N.) The past and present in dentistry. Internat. Dent. J., Phila., 1898, xix, 207–211.—**Penfold** (O. C.) Cysts of the region of the mouth. Dental Rec., Lond., 1898, xviii, 104–111.—**Perrogon** (L.) Chancre syphilitique de la lèvre inférieure. Gaz. méd. de Nantes, 1897–8, xvi, 155–158.—**Phocas.** L'ablation des amygdales. Rev. internat. de méd. et de chir., Par., 1898, ix, 76–78.—**Plicque** (A. F.) La tuberculose du pharynx chez l'enfant. Ann. d. mal. de l'oreille, du larynx [etc.], Par., 1898, xxiv, 234–237.—**Price** (W. A.) Some hard cases for cataphoresis, with suggestions. Ohio Dent. J., Toledo, 1898, xviii, 164–172.—**Réthi** (L.) Die Stimmbandspannung, experimentell geprüft. Sitzungsb. d. e. Akad. d. Wissenach. Math.-naturw. bl., Wien, 1897, cvi, 244–252.—**Reverdin** (J.-L.) **et A. Reverdin.** Nouvelle aiguille pour l'uranostaphylo-raphie; fourche porte-fil; allongement du voile du palais. Rev. méd. de la Suisse Rom., Genève, 1898, xviii, 137–143.—**Richard-Chauvin** (L.) **et F. Allard.** Applications de la radiographie a l'art dentaire. Odontologie, Par., 1898, 2. s., vi, 152–155, 1 pl.—**Ricklin** (E.) L'anesthésie régionàle par la cocaïne. Rev. internat. de thérap. et pharmacol., Par., 1898, vi, 97–100.—**Rigolet.** Observations sur la cataphorese dans la traitement des 2e et 3e degrés de la carie. Odontologie, Par., 1898, 2. s., vi, 155–157.—**Ritter** (P.) Ein Full von Gaumen-Nekrose nach Extraktion eines Zahnes aus syphilitischer Basis. Med. Rundschau, Berl., 1898, 213.—**Roe** (J. O.) Esophagotomy for the removal of a tooth-plate impacted five days in the upper third of the esophagus. J. Am. M. Ass., Chicago, 1898, xxx, 715.—**Rogers** (B. M. H.) A case of agnathia, or congenital absence of the lower jaw. J. Path. & Bacteriol., Edinb. & Lond., 1898, v, 137–142, 1 pl.—**Rose** (H.) Dental mechanics. Appliances and devices for the correction of dental irregularities. Brit. J. Dent. Sc., Lond., 1898, xli, 252–255; 299–301.—**Rosenthal** (C. H.) Electricity in the treatment of pulpless teeth. Dental Reg., Cincin., 1898, lii, 157–166.—**Rosenthal** (E.) Névralgies d'origine dentaire. Policlin., Brux, 1898, vii, 107–113.—**Roughton** (E. W.) Clinical remarks on miscellaneous cases. Brit. J. Dent. Sc., Lond., 1898, xl, 289–298.—**Schenk** (F.) Studien uber die Entwicklung des knöchernen Unterkiefers der Vögel. Oesterr.-ungar. Vrtljschr. f. Zahnk., Wien, 1898, xiv, 24–48, 5 pl. ——— *Also:* Sitzungsb. d. k. Akad. d. Wissensch. Math.-naturw. bl., Wien, 1897, cvi, 319–344, 5 pl.—**Schild.** Die Bedeutung der Ueberkappung für die conservative Zahnheilkunde. Oesterr.-ungar. Vrtljschr. f. Zahnk., Wien, 1898, xiv, 126–128.—**Schirmer** (A.) Ueber einen Fall von Soormykose beim Gesunden. J. f. Zahnkeilk., Berl., 1898, xiii, no. 11. ——— *Also:* Schweiz. Vrtljschr. f. Zahnh., Basel u. Genève, 1898, viii, 3.—**Schleich** (C. L.) On infiltration anæsthesia. Pediatrics, N. Y. & Lond., 1898, v, 335–341.—**Scott** (N. S.) Report of a case of resection of the jaw without external incision. Cleveland J. M., 1898, iii, 110.—**Sebileau.** Infections graves d'origine dentaire. [Abstr.] Med. inf., Par., 1898, ii, 145–147.—**Siffre** (A.) Redressement immédiat dans les cas de rétroversion. Odontologie, Par., 1898, 2. s., vi, 191–195.—**Simmons** (S.) The pulp; its conditions and treatment. Brit. J. Dent. Sc., Lond., 1898, xli, 198–208.—**Smith** (B. H.) The need of a national dental organization. Tr. Dent. Soc. N. Y., 1897, xxix, 117–130.—**Spence** (S. J.) Inter-alveolar administration of eucaine. Items Interest, N. Y., 1898, xx, 247.—**Spencer** (W. G.) Trigeminal neuralgia relieved by turbinectomy. Laryngoscope, St. Louis, 1898, iv, 260–262.—**Stellwagen** (T. C.) Dentistry or stomatology. Dental Cosmos, Phila., 1898, xl, 265–270.—**Stetter.** Beitrag zur Glossitis papillaris und tuberculosa. Arch. f. klin. Chir., Berl., 1898, lvi, 324–331, 1 pl.—**Taft** (J.)

The influence and power of association. Dental Reg., Cincin., 1898, lii, 151–156.—**Talbot** (E. S.) Degeneracy in its relation to deformities of the jaws and irregularities of the teeth. Dental Rev., Chicago, 1898, xii, 262–268. ——— Studies in evolution. Internat. Dent. J., Phila., 1898, xix, 206, 1 pl. ——— Oral hygiene. Items Interest, N. Y., 1898, xx, 188–193.—**Taylor** (C. R.) Metal posts for anchorage for fillings in incisors and cuspid teeth.—Dental Rev., Chicago, 1898, xii, 257–262.—**Thomas** (J. L.) Operation upon the Gasserian ganglion by the Hartley-Krause method for facial neuralgia; three years after. Brit. M. J., Lond., 1898, i, 487.—**Tishkoff** (I. P.) [Abscess of the tonsil complicated by acute oedema of the larynx.] Protok. zasaid. Obsh. mosk orach. v. Kronstadte, 1896–7, xxxv, 72–82.—**Tomes** (C. S.) Upon Röse's proposed classification of the forms of dentine. Anat. Anz., Jena, 1897–8, xiv, 343–348.—**Torger.** Osservazioni dell' attualità. Gior. di corrisp. p. dentisti, Milano, 1897, xxvi, 339–345.—**Trueman** (W. H.) M. Nicholas Dubois De Chemant, and porcelain dentures. Dental Pract., Buffalo, 1898, xxix, 67–70.—**Truman** (J.) Dental organizations. Tr. Dent. Soc. N. Y., 1897, xxix, 110–116.—**Turner** (W. A.) The treatment of trigeminal neuralgia. Treatment, Lond., 1897, i, 389.—**Vann** (G. S.) The teeth and their predisposition to disease. Dental Headlight, Nashville, 1898, xix, 49–53. —**Voerckel** (G.) Hyperämischer Kopfschmerz als Ursache einer Blutung post extractionem. Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 172.—**Voerckel** (G.) **und B. Weber.** Ueber die Zahn- und Mundpflege bei den Volksschulkindern. *Ibid:* 105–117.—**Vollmer** (E.) Beitrag zur Lehre von der schwarzen Haarzunge! Dermat. Ztschr., Berl., 1898, v, 29–32.—**Waddelow** (J. J.) Remarkable misadventure with chloroform. Lancet, Lond., 1898, i, 749.—**Waldin** (K.) Beitrag zur Casuistik des Herpes Zoster palati duplex. Arch. f. Laryngol. u. Rhinol., Berl., 1898, vii, 309–325.—**Walker** (W. E.) The implantation of sterilized roots of animals' teeth carrying artificial crowns. Tr. Am. M. Ass., Chicago, 1898, xxx, 726.—**Walkhoff** (O.) Beiträge zum feineren Bau des Schmelzes und zur Entwickelung des Zahnbeins. III. Zahnbeinkanäle im Schmelz. Deutsche Monatschr. f. Zahnh., Leipz , 1898, xvi, 65; 119. ——— Die Entwickelung der Grundsubstanz des Zahnbeins. *Ibid:* 72–79.—**Ward** (C. H.) Human teeth from a comparative standpoint. Dental Cosmos, Phila., 1898, xl, 253–265. —**Warren** (W.) Acute inflammation in the maxillary sinus. Med. Age, Detroit, 1898, xvi, 97–100.—**Wassall** (J. W.) Oral hygiene. Dental Rev., Chicago, 1898, xii, 284–286.—**Watson** (W. T.) Papilloma of the epiglottis. Maryland M. J., Balt., 1897–8, xxxviii, 403.—**Weisse** (F. D.) Fractures of the maxillæ. Dental Cosmos, Phila., 1898, xl, 188–196.—**Welch** (T. B.) Mysterious tooth decay. Dental Brief, Phila., 1897–8, ii, 519–521.—**Wells** (D. W.) Visual defects of dentists. Dental Cosmos, Phila., 1898, xl, 27–34.—**White** (J. A.) Dental-plate with central incisor attached, impacted in œsophagus three months, removed per vias naturales. Virginia M. Semi-Month., Richmond, 1897–8, ii, 703–705. [Discussion], 713.—**Whittles** (D.) Some factors which cause eruption of the teeth. Internat. Dent. J., Phila., 1898, xix, 94–100.—**Wilcox** (S. F.) The perils of anæsthetic mixtures. Med. Rec., N. Y., 1898, lii, 500.—**Wilson** (L. B.) Electro-deposition of metals. Items Interest, N. Y., 1898, xx, 181–183.—**Wolff** (A.) Ein sterilisierbares Tonsillotom. Med. Rundschau, Berl., 1897–8, 59.—**Woolley** (J. H.) The application of heat in dentistry for the destruction of pathogenic germs. Dental Rev., Chicago, 1898, xii, 172–175. **Wright** (J.) Remarks on pharyngeal mycosis. Laryngoscope, St. Louis, 1898, iv, 221–223. [Discussion], 246–250.—**Wood** (W. A.) Hydrocele of canal of Nuck. Intercolon. M. J., Australas, Melbourne, 1898, iii, 29.—**von Wunschheim** (G.) Ein beweglicher Kammerspiegel. Oesterr.-ungar Vrtljschr. f. Zahnk., Wien, 1898, xiv, 19–24.—**York** (E. L.) De la diffusibilité des coagulants dans la dentine. Rev. odont., Par., 1898, xvii, 14–18.—**Zadok.** Mort subite au cours d'un abcès latéro-pharyngien. J. de clin. et de thérap. inf., Par., 1898, vi, 86.

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# LIST OF UNITED STATES PATENTS

## PERTAINING OR APPLICABLE TO DENTISTRY

### ISSUED DURING APRIL, 1898.

*April 5.*—No. 601,703, to Edward L. Chaffin. Artificial denture.
" *12.*—No. 602,084, to Lauritz P. J. V. Kjoer. Arm-support for dentists.
" " No. 602,103, to J. W. Place. Cabinet.
" *19.*—No. 602,572, to Arthur W. Browne and Chas. M. Kennedy. Saliva ejector.
" " No. 602,581, to M. W. Hollingsworth. Artificial tooth-crown.
" " No. 602,582, to Woodbury S. How. Crown-post for artificial teeth.
" *26.*—No. 603,179, to Wm. F. Davison. Tooth fillings.

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# ORIGINAL COMMUNICATIONS.

## ON STRUCTURAL CHANGES IN HUMAN ENAMEL; WITH SPECIAL REFERENCE TO CLINICAL OBSERVATIONS ON HARD AND SOFT ENAMEL.

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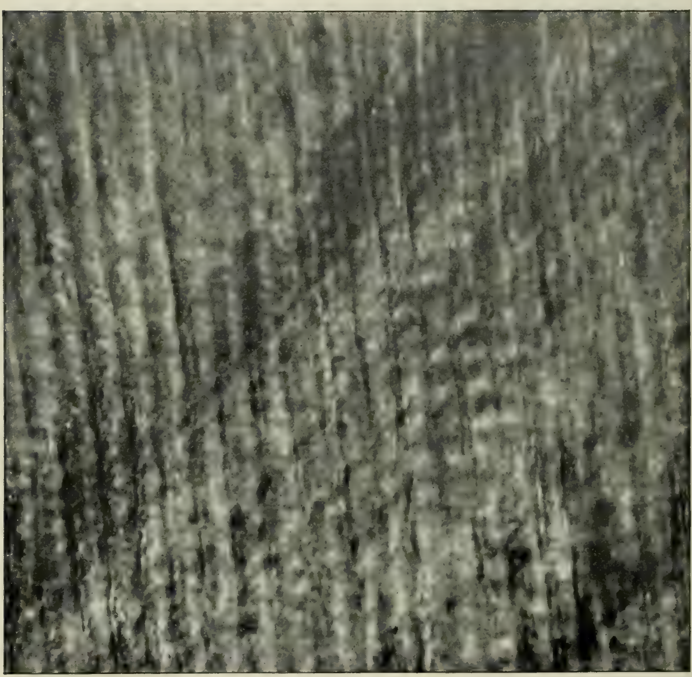
(Read before the British Dental Association at Bath, England, May 30, 1898.)

MR. PRESIDENT and gentlemen of the British Dental Association, I thank you for your kind reception, and for the honor conferred in the invitation to read a paper before this society.

The wise practical rule you have adopted, of limiting papers to twenty minutes, makes it unnecessary for me to apologize for not indulging in any purely ornamental introductory remarks, and I shall, I am sure, be acting in accordance with your wishes if I plunge at once into my subject.

An examination of the literature of dentistry will show that the opinion has been held, almost throughout the history of the profession, that human teeth undergo structural changes. For a time this belief was confined to the view that teeth degenerate and become softer, and this phase of belief was founded upon clinical observations. But out of these observations there was evolved a theory that the structural changes were due to *intra-vitem* states, involving fluctuations in the nutrition of the tissues and the general physiological conditions of the parts. Having once got hold of this theory, it was, of course, a perfectly natural thing to go a step farther and say that inasmuch as it is a matter of clinical observation that enamel may become softened, which softening (here the theory stepped in) is due to lack of proper nutrition, therefore the converse must be true, and enamel which has softened or which was not originally properly hardened because of insufficient nutritive material may become hard and resistant if the proper food be supplied. Thus was ushered in the era during which children, and often adults, were dosed with various phosphatic preparations, until many an individual had swallowed material enough to make several sets of teeth, the only noticeable effect of which was, in a great majority of cases, to disturb the digestive functions, and so hasten the destruction of the fast-disappearing dental organs. But in some cases, no doubt, the general health was improved by this treatment, and decay of the teeth proceeded more slowly, not because the enamel of the teeth had improved in quality, but because those environing conditions which constitute the true predisposing cause of dental caries had been changed by the improvement in the general health. You know how it used to be in a country neighborhood when some one held a successful lottery ticket. It became the talk of the town, and everybody invested in lottery tickets. The ninety and nine who lost their money said little or nothing about it, but they all continued to talk of the successful one. And so it was for many years with the administration of phosphatic remedies for decaying teeth. Everybody talked about the few

FIG. 1.

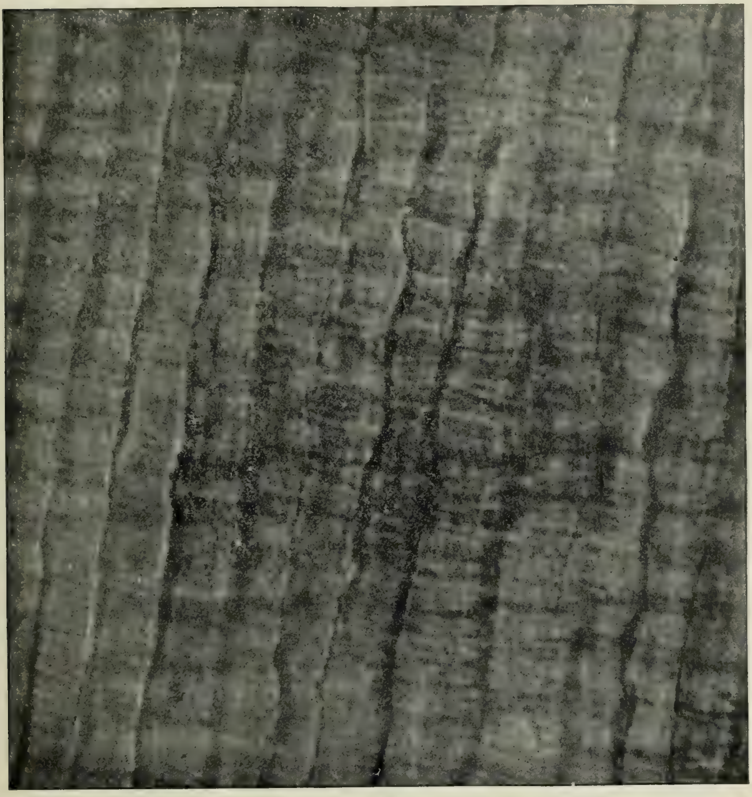


LONGITUDINAL SECTION OF NORMAL HUMAN ENAMEL. × 1000.

cases which seemed to improve under the treatment, and forgot all about the ninety and nine who were made worse.

More than fifteen years ago I pointed out that, from the *a priori* standpoint, physiological changes in completely formed enamel are impossible. I called attention to the well-known fact that the nutrient function is simply the formative function reduced in activity to the point of making good the loss occasioned by waste, and that, as the formative organ of enamel completely disappeared at or before the time of the eruption of the tooth, there was no possible means by which the enamel molecule or molecules could be formed. The position was a perfectly sound one logically, but, as it made no attempt to explain the softening of teeth, which was a matter of general observation, it failed to carry conviction to the majority. I was severely attacked, as young men must always expect to be when they have the effrontery to present anything new which calls for a modification of older views, and told that I was

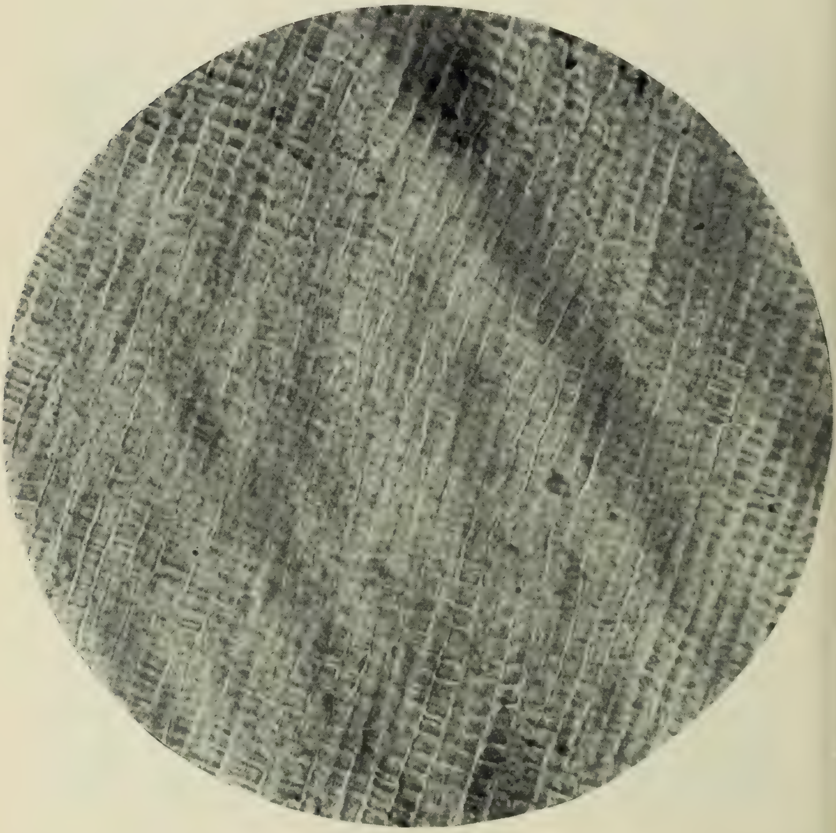
FIG. 2.



LONGITUDINAL SECTION OF NORMAL HUMAN ENAMEL. × 2000.

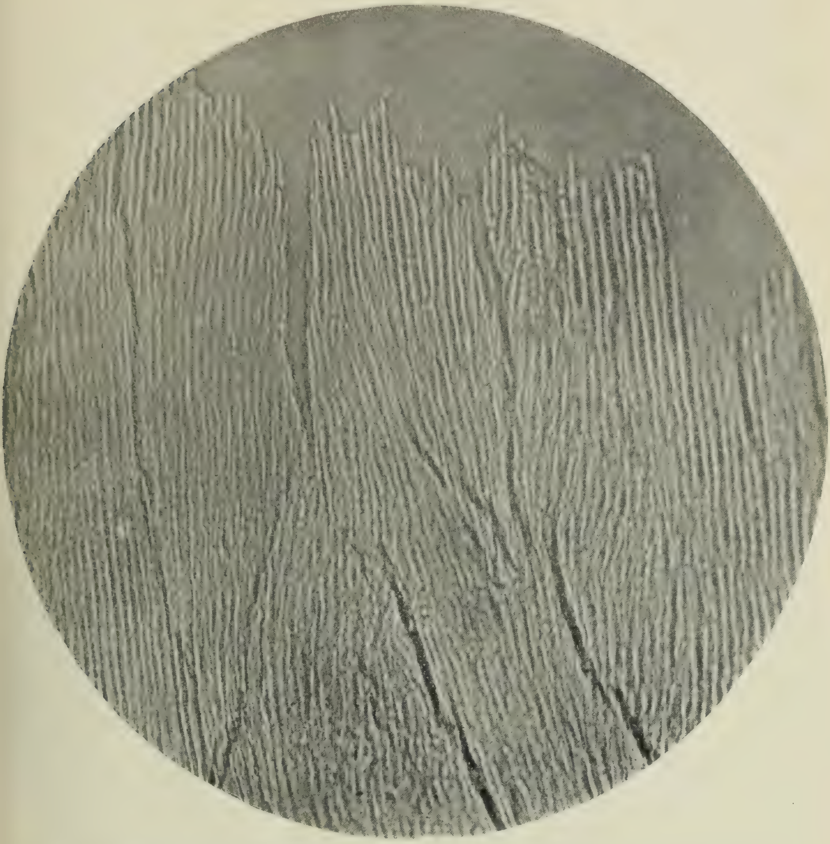
attempting to teach before I had myself learned half the alphabet. I have no doubt there was considerable truth in what my opponents said, but still I believed that I had got hold of some valuable facts, and I stuck to them. Ten years or more after I had taken up this position, Dr. G. V. Black, who had throughout supported me, astounded the dental world by the publication of a series of papers in which he showed, by a very exhaustive series of experiments, that there is no such difference in the per cent. of lime-salts in teeth as had always been supposed. Thus, at a single stroke, was eliminated what had always been regarded as the chief factor in the problem of tooth degeneration and decay. A little later came the publication by Mr. Charles Tomes of the results of his researches

FIG. 3.



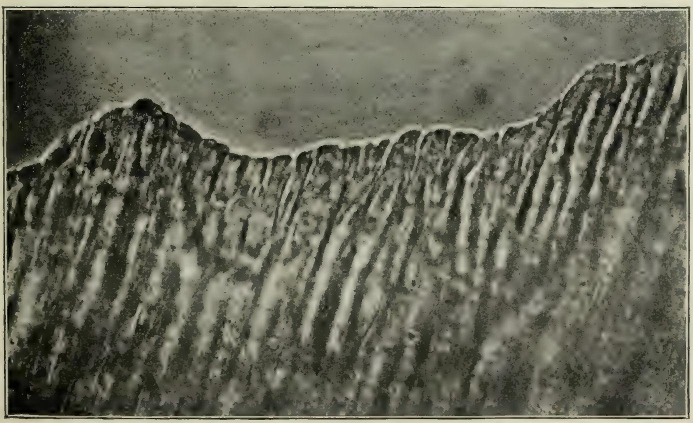
Longitudinal section of human enamel treated for a few minutes with a one-half of one per cent. solution of hydrochloric acid, the result of which is that the cement-substance, which unites the rods and the sections or globular bodies of which the rods are built up, has been partially dissolved.

FIG. 4.



Longitudinal section of human enamel which has been treated with dilute hydrochloric acid, showing the action of the acid on the upper thin edge of the enamel. The rods are seen to be more or less isolated by the solution of the cement-substance.

FIG. 5.

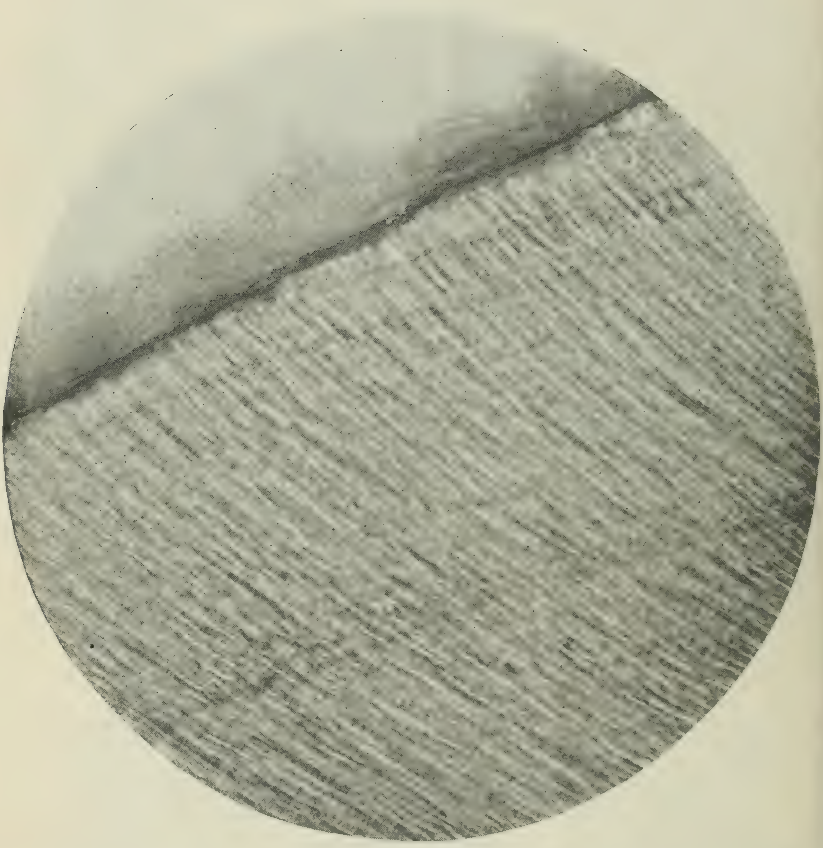


Section of decaying enamel from which the bacteria have been removed, to show that the action of the acid of decay is substantially the same as that of acids applied artificially.

in this same field, which largely confirmed the positions of Dr. Black and myself.

Mr. Tomes was the first to confirm by chemical analyses my contention that there is practically no organic matter in mature enamel, and the absence of organic matter, of course, means an entire absence of organic change. Soon after the publication of Mr. Tomes's report my papers on "Pathology of Enamel" appeared in the Dental Cosmos. This work was undertaken to clear up the mystery or obscurity surrounding the very commencement of the process of caries on the surface of the tooth. Incidentally several other things appeared, the most important of which was a complete explanation and demonstration of the long-observed softening of enamel, even when there is no external

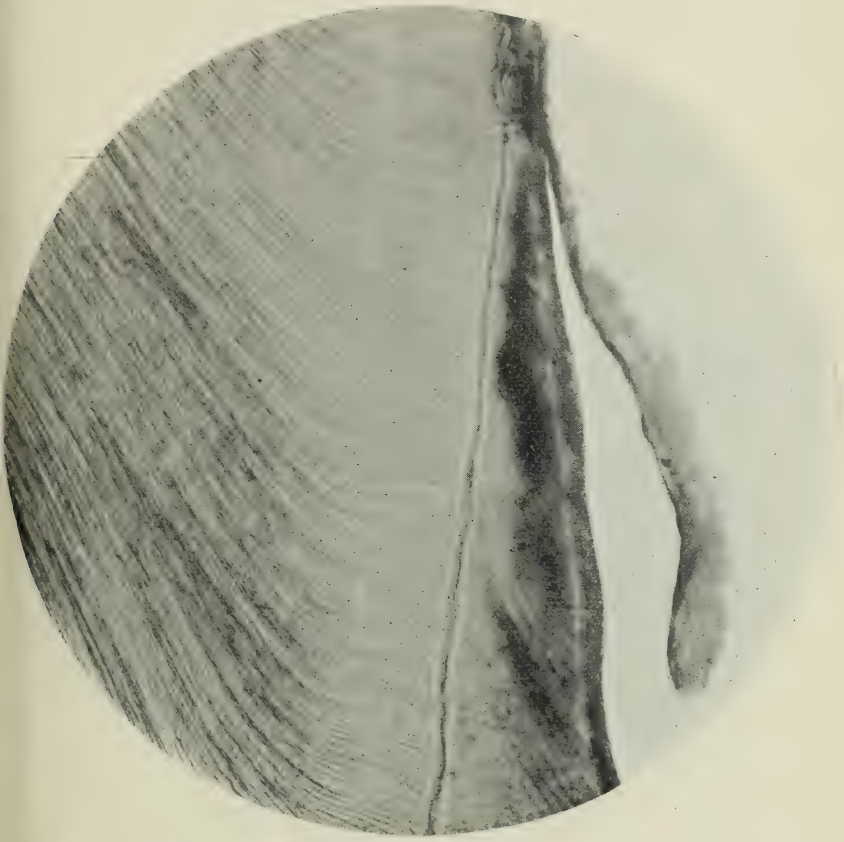
Fig. 6.



The usual appearance of a section of enamel from the approximal surface of a human tooth. The surface is everywhere seen to be covered with a thick growth of micro-organisms.

evidence that such a softening process is going on. This point was hardly more than touched upon in the series of papers referred to, and, although Dr. Black and a few others seized upon its significance at once, I believe its importance has been generally overlooked, and it is to further and more detailed proof of the phenomena of the softening of enamel by external agencies that I now invite your attention.

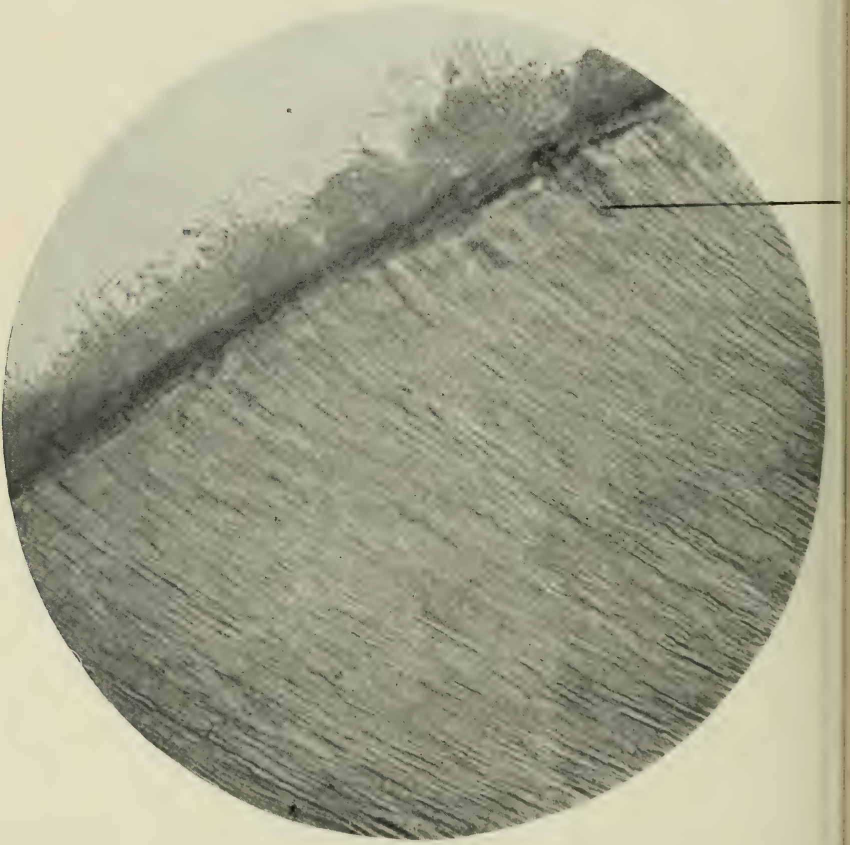
FIG. 7.



Longitudinal section from approximal surface of human tooth, near the neck, showing how the bacteria are usually lost in balsam-mounted specimens.

If we grind a thin section of normal human enamel and mount it for microscopical examination, the appearances are as shown in Figs. 1 and 2. Under low and medium powers of magnification the enamel-rods appear to be quite smooth, and the individual rods not strongly differentiated from each other. Under high powers the rods are seen to have an irregularly wavy or varicose outline. If this same section, which we will suppose has been temporarily mounted in glycerol, be now exposed for a few minutes to the action of a one-half of one per cent. solution of hydrochloric acid and again mounted for study, some very marked changes will be observed to have taken place. Not only are the rods much more clearly differentiated from each other, but many of the rods are further seen to be divided into sections. (See Fig. 3.) What has happened to produce this appearance? I have said in former papers that the appearance is caused by the partial solution of a cement-substance, which unites the rods and the sections of which the rods are built up. Von Ebner stated some time ago, as you remember, that acids first act upon the substance of the rods themselves, and recently, from several quarters, this matter has been said to be in doubt. Dr. Biro, for instance, in a paper read a short time ago before the Royal Hungarian Society of Doctors, ex-

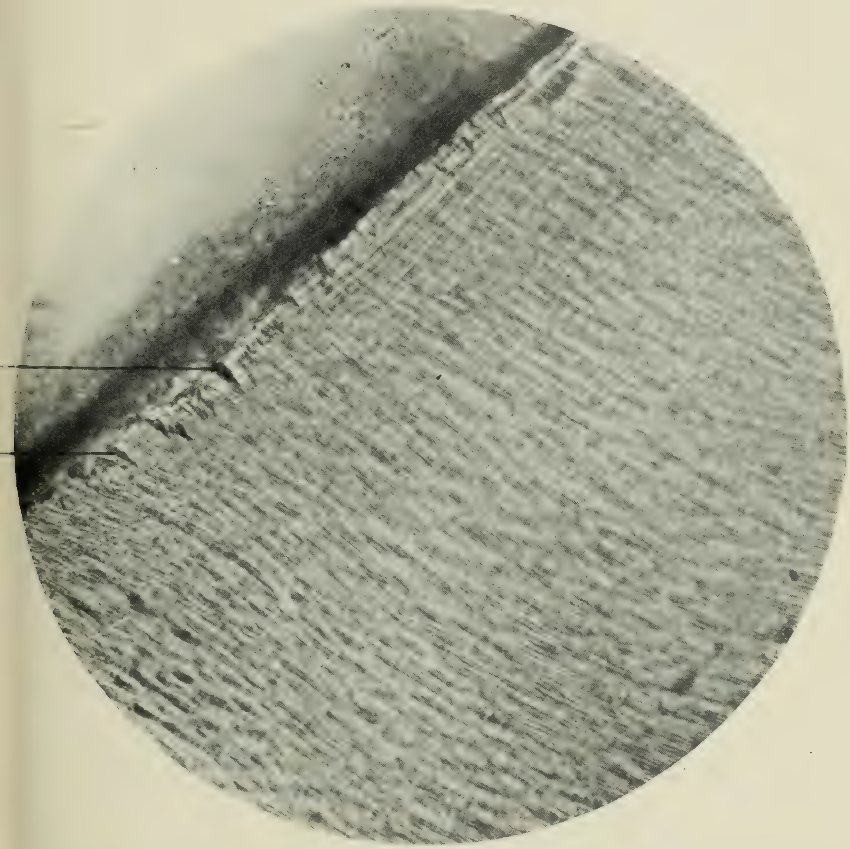
FIG. 8.



Section of human enamel, showing, at *a*, one appearance of the action of acid excreted by bacteria in penetrating the enamel.

pressed himself as unable to decide whether Von Ebner's statement or mine is to be received. From my point of view, it should not be considered a controversial question for a moment. Any one who has a microscope, and cares to spend twenty minutes' time over the matter, can easily determine the point for himself. Grind a longitudinal section of enamel so that one edge is very thin and the other a trifle thicker, and expose to the action of weak hydrochloric acid for a few minutes and then mount for examination. If the work has been properly carried out, the appearances will always be as shown in Fig. 4. The acid, acting on the thin edge of enamel, has completely isolated the ends of many of the rods by dissolving away the cement-substance which united them, and at the same time the globular sections of which the rods are

FIG. 9.

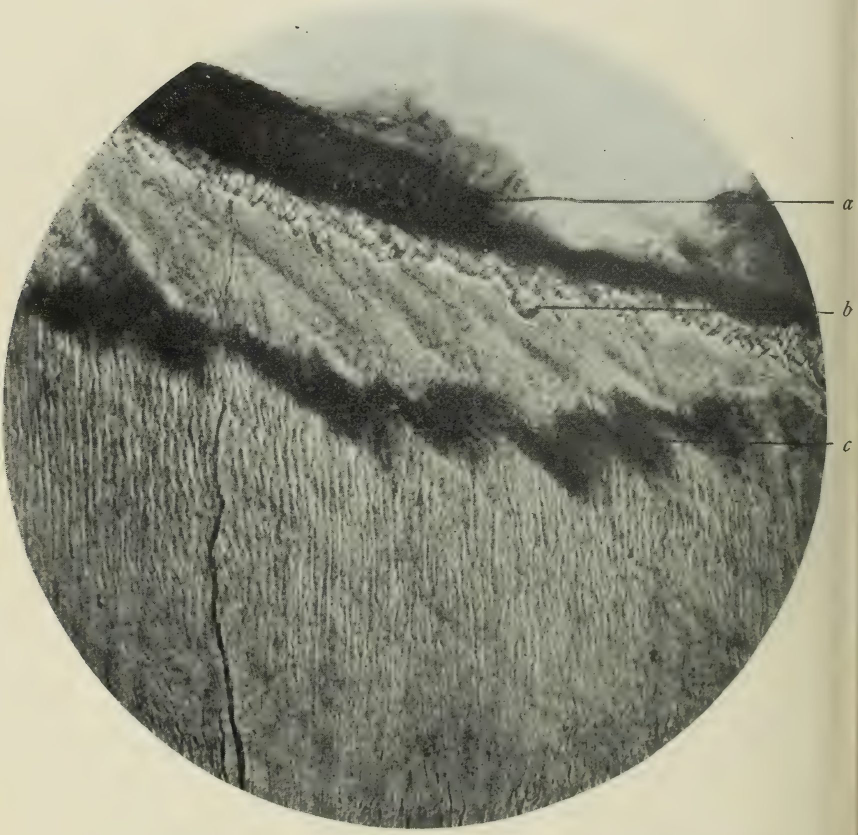


From section of human enamel, showing, at *a* and *b*, another and more frequently observed appearance from the attack of the acid of decay.

built up are plainly indicated. I do not see how a more complete or convincing proof could be asked for than that which is shown here.

In Fig. 5, where the ends of the enamel-rods are shown under much higher power, it is seen that substantially the same effect is produced by the action of the acid excreted by bacteria. The center of the rod is never hollowed out or depressed, but, on the contrary, always projects considerably beyond the cement-substance, thus proving conclusively that the cement-substance is more quickly acted upon than the substance of the rod itself. It is important that this point be thoroughly established, for without it none of the appearances which we may observe in decaying enamel are in the least intelligible; while if it is once clearly seen how

FIG. 10.

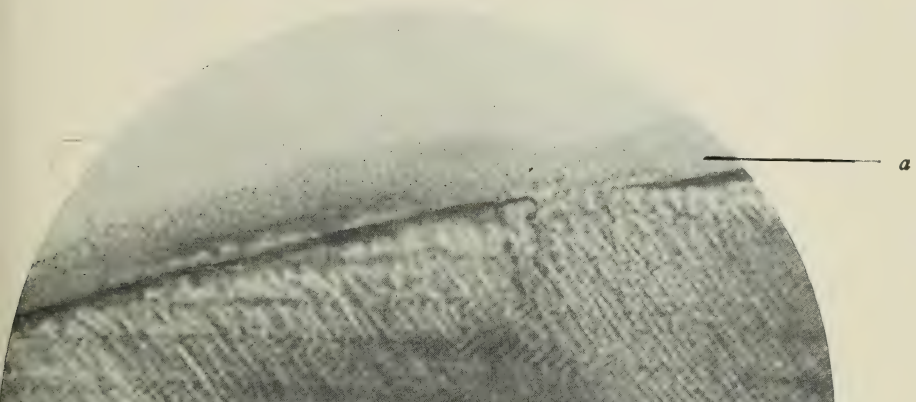


From section of human enamel in the early stages of decay. The dark band, *c*, below the surface indicates a temporary arrest in the action of the micro-organisms. *a*, Micro-organisms deeply stained; *b*, Evidence of the recent and vigorous action of the acid of decay.

acids act upon enamel, all that follows is perfectly plain. We see, then, that the effect of acid artificially applied to enamel is by solution of the cement-substance to render the tissue porous and friable, and consequently less resistant to pressure or to the action of cutting-instruments.

We have now to inquire to what extent a similar process is going on in the enamel when in its natural condition in the mouth.

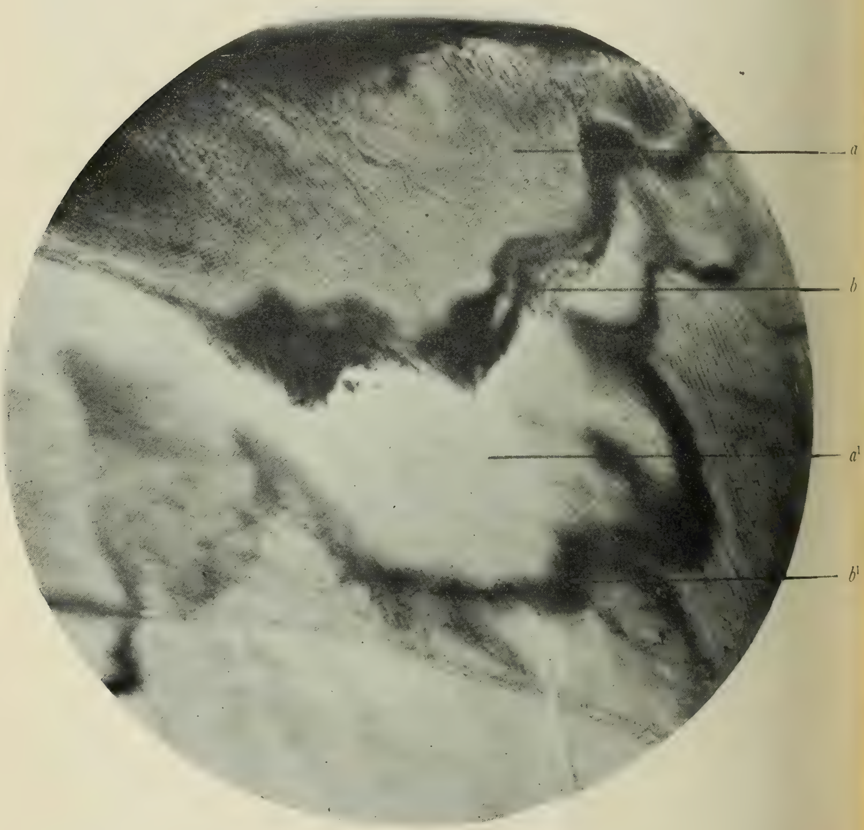
FIG. 11.



Section of human enamel, showing changes which take place in the progress of caries previous to any external evidence of such action. *a*, Bacteria; *b*, Area of enamel acted upon by acid of decay; *c*, Normal enamel.

Many of you will remember that in my recent series of papers on "Pathology of Enamel" I published quite a number of photographs showing acid-forming bacteria attached to the surface of enamel. Further experience has convinced me that the cases in which the approximal surfaces are *not* covered by a thick, felt-like, and glutinous mass of micro-organisms are very rare. In fact, since I devised a simple means of grinding thin sections of enamel without disturbing any bacteria which might be present on the surface, I have not once failed to find them on the approximal surfaces of teeth. The usual appearances, after the section has been ground and mounted in glycerol, are such as are shown in Fig. 6. In cases where the enamel is much discolored and it is desired to show the structure of these discolored portions, the section must be cleared and mounted in balsam. The shrinkage which this treatment seems to produce in organic matter almost invariably causes the film of bacteria to become loosened from its attachment

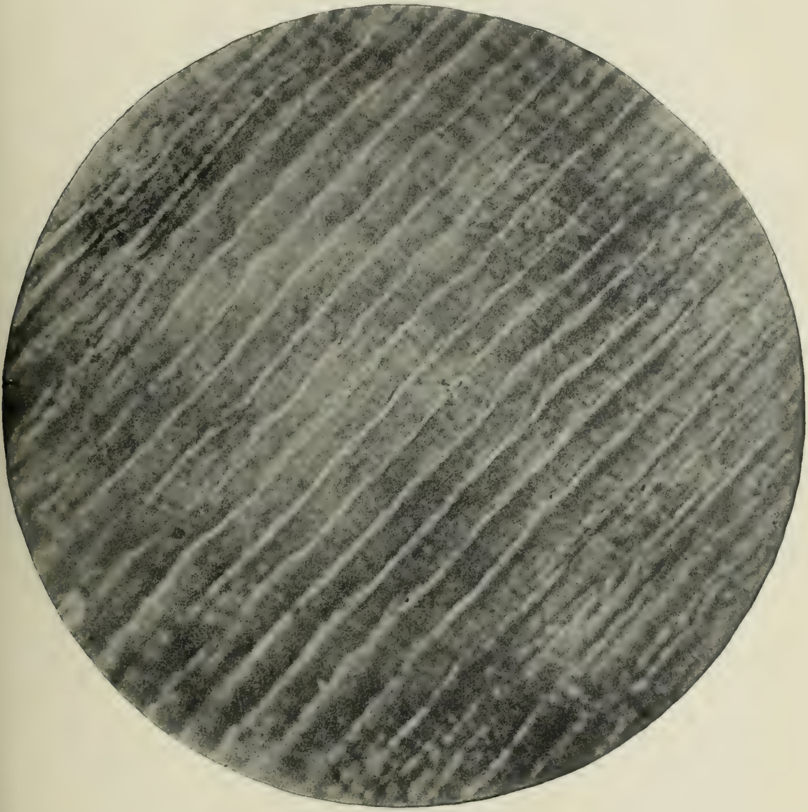
FIG. 12.



Section of human enamel, showing fluctuations in the action of the acid of decay. *a* and $a^1$, showing more rapid action of acid; *b* and $b^1$, showing partial temporary arrest of the action of the acid. It should be understood that the difference in color between rapid and slow decay is, from the point of view of the microscopist, always a comparative difference. All enamel which has been acted upon by the acid of decay is less translucent than normal enamel, and transmitted light is always more or less dispersed; so that although, to the unaided eye and by reflected light, enamel undergoing rapid decay may be whiter than the normal tissue, yet by transmitted light and under the microscope such tissue would always appear darker than normal.

to the enamel, and it is thus washed away. As the custom has always been to mount sections of teeth in balsam, this probably explains why the almost universal presence of bacteria on approximal surfaces has not been discovered before. This is perfectly illustrated in Fig. 7, from a balsam-mounted specimen. Knowing that a film of bacteria was present on the approximal surface from which this section was ground, I have managed by the exercise of great care to retain its attachment at one end, although, as you see, it was nearly lost. You will observe that certain changes, indicated in the photograph by the deeply stained places, have taken place in the enamel. Now, suppose I had never seen bacteria attached to the surface of enamel, and, having no knowledge that they were present in this specimen, I had prepared and mounted it in the usual way, during which treatment the bacteria

FIG. 13.



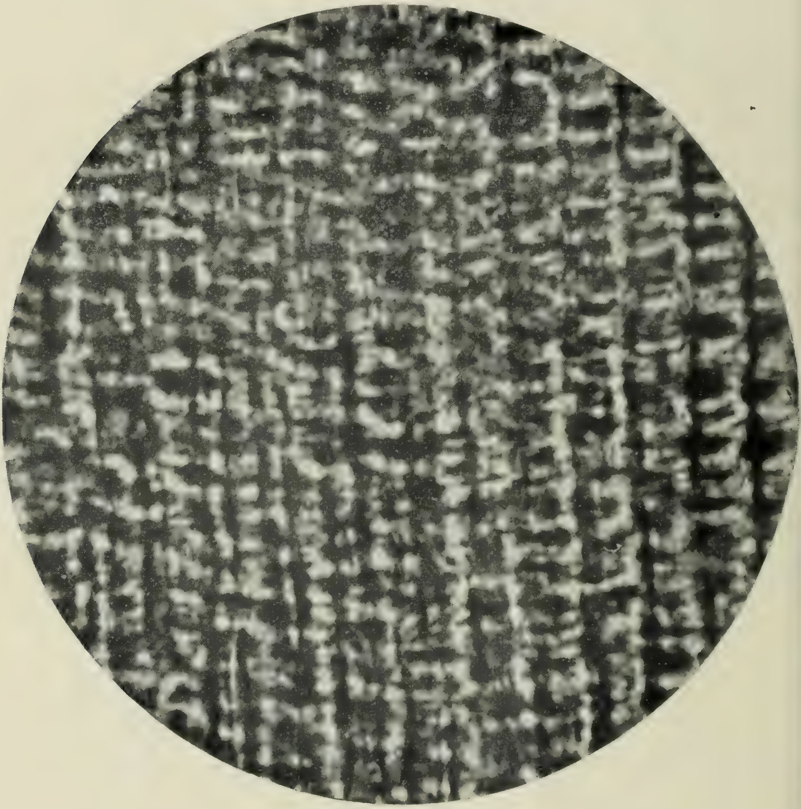
FROM SECTION OF HUMAN ENAMEL. × 1000.

Showing results of action of acid of decay in dissolving the cement-substance between the enamel-rods. Rapid decay. Compare with Fig. 14, showing slow decay.

would have disappeared, what would my conclusions have been with reference to the imperfect enamel? Obviously, I should have confirmed the prevalent belief that all such appearances indicate imperfect development or degeneration, due to some unfavorable physiological condition.

My studies of this subject during the past year have been chiefly directed toward observing the changes which occur in enamel beneath these bacterial growths, previous to the commencement of the actual breaking down of the tissue. The result of these studies has been surprising, notwithstanding my previous experience. In the clinical examination of the approximal surfaces of teeth, if there is no perceptible roughness, if our fine exploring points pass smoothly over the entire surface, we pronounce the tooth quite

Fig. 14.



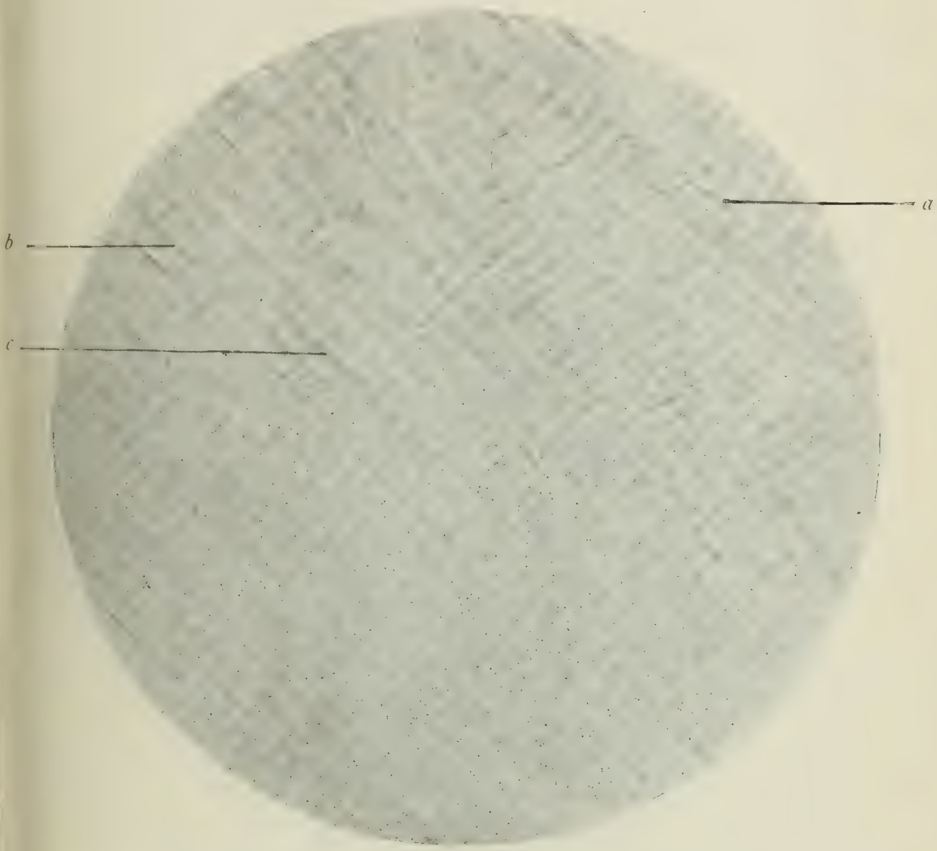
From Section of Human Enamel in Slow Decay. × 2000.

The acid of decay has slowly infiltrated through the enamel in every direction, dissolving the cement-substance and showing how the globular bodies of the enamel-rods are originally connected with each other by plasmic strings or processes.

sound at that part. I shall be able to show you that this soundness is very often only apparent, and that the actual breaking down of the enamel is only one step coming toward the close of a long series of structural changes, which may have been in progress for years before there is any external evidence of such changes.

The appearances produced by the first action of the acid of

FIG. 15.



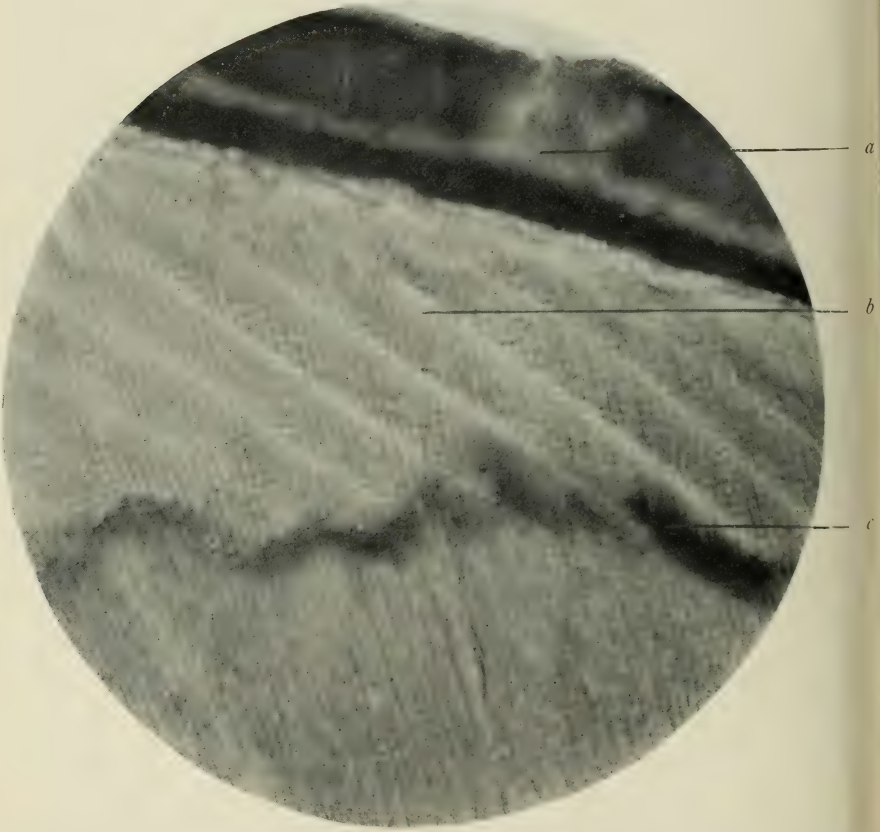
SECTION OF HUMAN ENAMEL, SHOWING EFFECTS PRODUCED BY ACID OF DECAY. × 800.

*a*, *b*, and *c*, Points where the section has intersected the canals formed by the penetration of the acid.

bacteria upon enamel vary considerably, as may be seen by comparing Figs. 8, 9, 10, and 11. This variation is, without doubt, to some extent due to variations in the structure of the tissue, but I believe it is largely due to variations in the energy of the microorganisms themselves. My reason for this view will appear as we proceed.

In Fig. 8 we see that the acid has dissolved out channels or wells, the walls of which are parallel. In Fig. 9 we have the V-shaped spaces which are very often found at the commencement of one form of decay. In both of these specimens there is no discoloration of the enamel. In Fig. 10 the acid has penetrated to a considerable depth without discoloration. Then comes a deeply stained band, beyond which the tissue is again free from stain, and the cement-substance between the rods partly dissolved for some distance below the stained area. Near the surface a recent and more vigorous attack of the acid seems to have taken place, and the tissue is nearly in the condition of completely breaking down. In Fig. 11 we have a sharply limited area where the acid has penetrated, and this area is stained throughout; and Fig. 12 shows in the

Fig. 16.



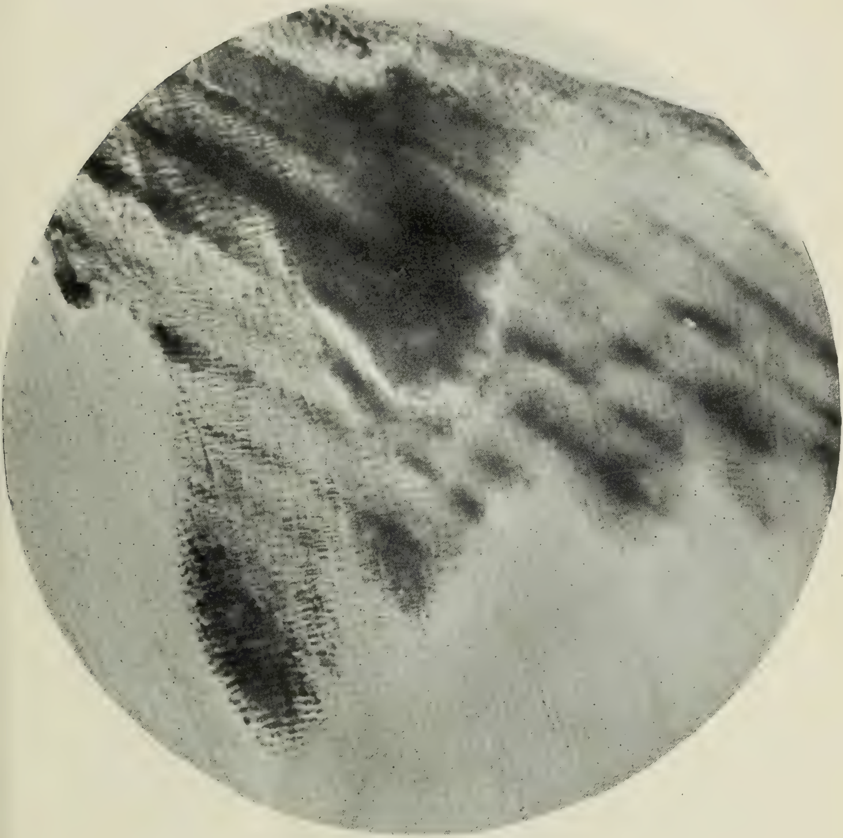
Section of Decaying Human Enamel. × 400.

*a*, Thick layer of bacteria deeply stained; *b*, Area showing rapid action of acid of decay; *c*, Dark band showing partial arrest of action of acid.

field of view three wide light bands, irregularly separated by dark, narrow bands.

As there is nothing in the structure of the tissue in these different specimens to account for the very marked difference in appearance, especially the presence of the light and dark bands, have we any explanation to offer? I think so; and I believe this explanation is one of the most important points I have to present for your consideration, as bearing directly upon the true predisposing cause of dental caries. It has been a matter of well-known observation for many years that very rapid decay is accompanied by little or no discoloration, while the tooth-substance in slow decay is deeply pigmented. I think we may safely assume, therefore, that the discolored bands referred to represent a partial arrest in the progress

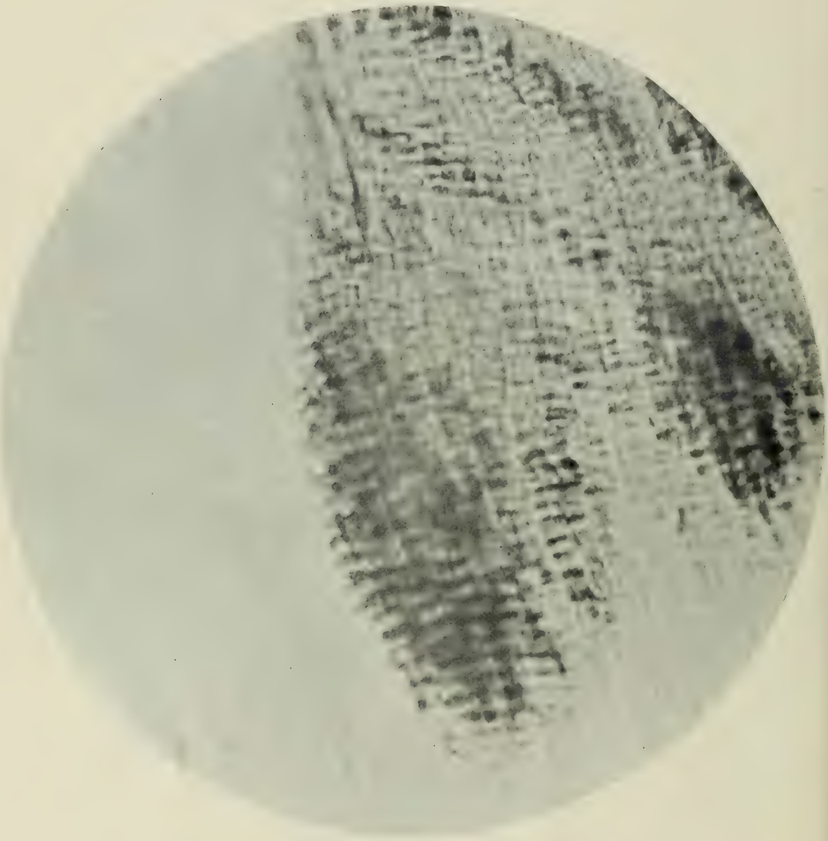
FIG. 17.



FROM SECTION OF DECAYING ENAMEL. × 400.
Shows slow and uneven action of acid.

of the action of the acid of decay, or, in other words, the bacteria which produce the acid were, for some reason, less active during a period corresponding to the formation of the dark bands. It would be difficult to prove this view completely without a long series of experiments and observations, but there is some evidence bearing directly upon the point. In my papers on "Pathology of Enamel" I called attention to several specimens in which there was clearly seen a partial or temporary arrest of decay at well-marked lines of stratification. Since the publication of those papers the facts stated on this point have been corroborated by further observations, and I have noticed that in every instance the line along which there is a temporary arrest of decay is deeply colored. But in these instances there is no reason for assuming any decrease in the activity of the bacteria; and this fact led me to look more care-

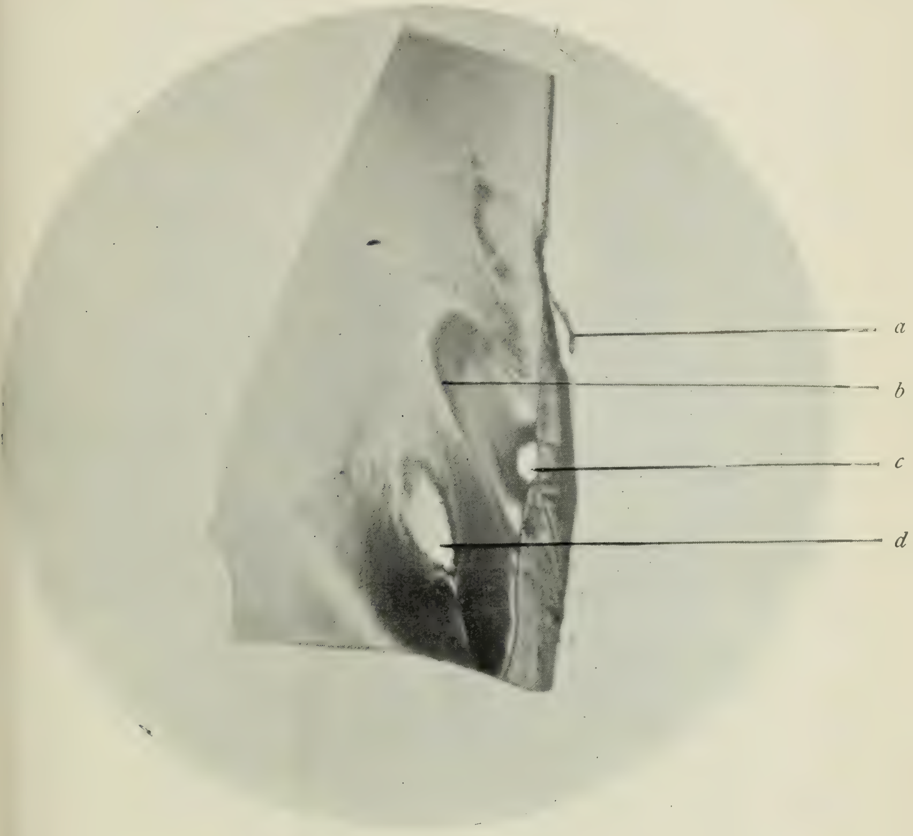
Fig. 18.



From Section through Decaying Enamel. × 800.

fully into the cause of the staining of enamel during the progress of caries, and I find that the discoloration, at least so far as enamel is concerned, is largely an optical illusion. It seems that the structural changes in slow decay are markedly different from those which take place in rapid decay. In rapid decay the acid penetrates quickly and deeply along the lines of the inter-rod cement-substance, and the rods themselves become isolated and break down before there are any very marked changes in their internal structure. But in slow decay the entire substance of the rod becomes infiltrated with acid, and a sort of sponge-like structure is produced, the effect of which is to break up and disperse certain of the constituents of the rays of light so that, viewed by transmitted

FIG. 19.



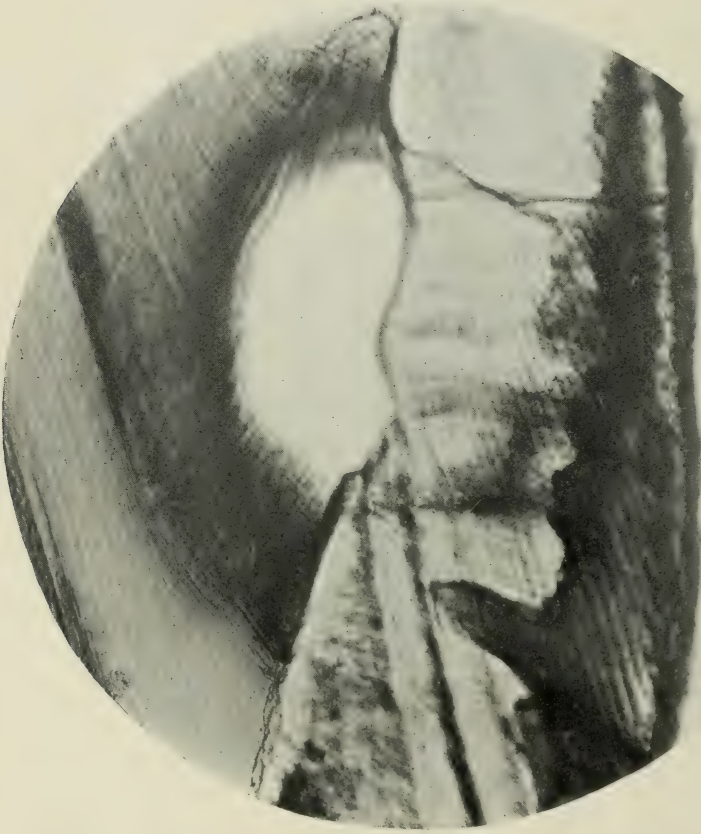
FROM SECTION THROUGH APPROXIMAL SURFACE OF BICUSPID. × 12.

*a*, Film of bacteria partly torn away from enamel; *c*, Internal cavity formed before there is any external breaking down of tissue; *b*, Extent to which dentin has been affected by the penetration of the acid of decay; *d*, Secondary dentin.

light, there is an appearance of discoloration; while these same specimens, seen by reflected light, are chalky white.

These differences in the action of the acid are well illustrated in Figs. 13 and 14, the former being from a section showing very rapid white decay, while the latter was from a case of very slow decay. Now, I find that in all cases the structure in the discolored bands approximates closely to that shown in the case of known slow decay, while the light bands always correspond in structure to that shown in the case of known rapid decay. We thus have a double line of evidence, you see, that the dark bands represent a retardation in the progress of decay. This retardation in those

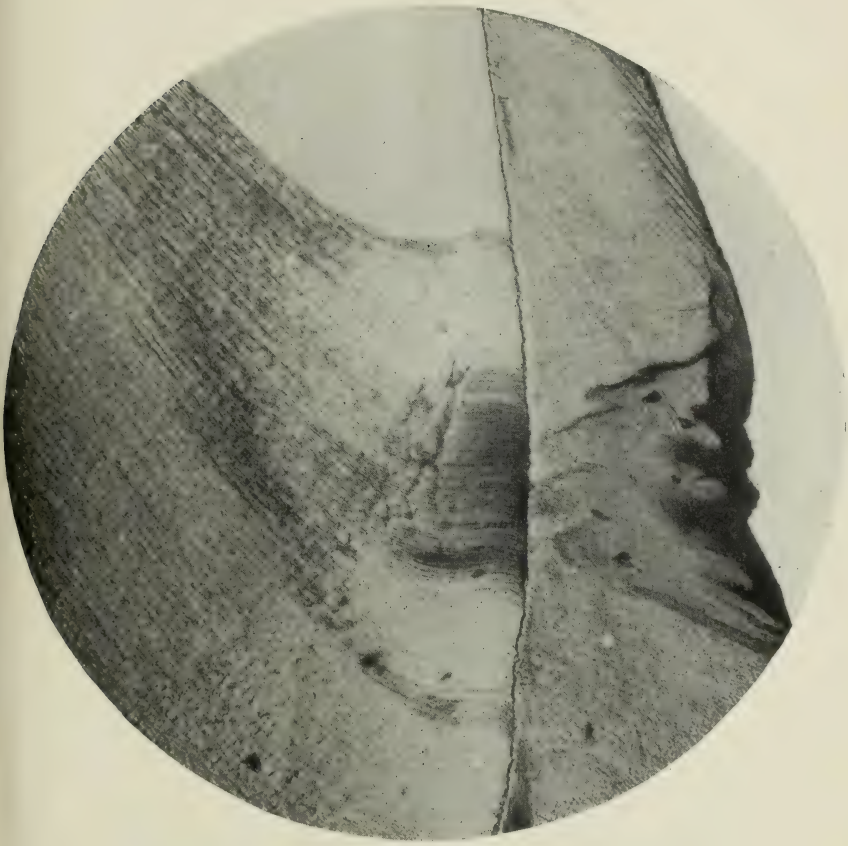
Fig. 20.



A more highly magnified view of a portion of the preceding illustration. Shows complete destruction of a considerable portion of dentin, while the external surface of the enamel is still intact. The enamel over the entire approximal surfaces of this tooth was completely saturated with the acid of decay, and could be easily scraped away with an excavator, but while in position in the mouth it would have been pronounced free from decay.

very exceptional cases of marked stratification is probably largely due to the break in the continuity of the cement-substance, but in all cases where there is no discoverable irregularity in the natural structure of the enamel we may, as I have said, safely assume that the retardation in the action of the acid is due to a change in the environment of the teeth, which is unfavorable to the development and activity of the bacteria producing the acid. Further confirmatory evidence of this view will be found in Figs. 15, 16, 17, and 18, the effects of rapid decay being shown in the two former, where the principal change has been the solution of the cement-substance between the rods, while in the two latter there is, in addition to the effect already noted, a marked change in the structure of the rods, the sections of the rods being more or less divided and infiltrated by the acid, with the accompanying appearance of discoloration.

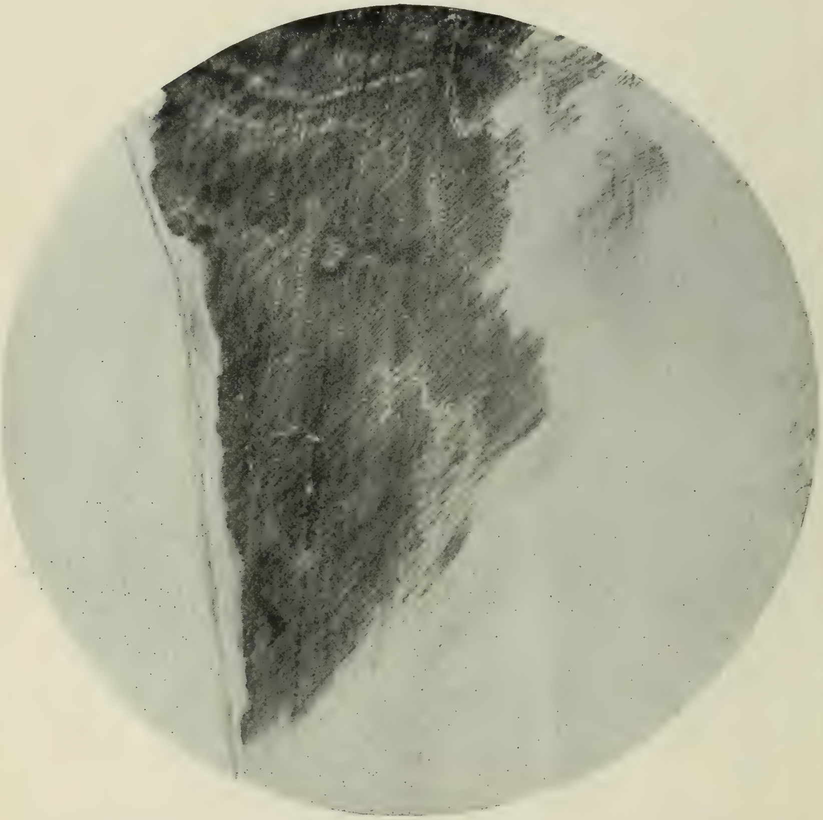
FIG. 21.



Showing effects in enamel and dentin of the penetration of the acid of decay.

I suppose the strangest thing, and therefore the thing most difficult for those to realize who have not especially studied the subject, is the extent to which the enamel may be penetrated by the acid of decay before there is any indication to the unaided eye of failure on the surface of the tooth. Nearly all of the illustrations accompanying this paper are selected to show this point. Figs. 19, 20, and 21 present facts which would not be believed if they did not carry incontestable proof with them. In Fig. 21 there is a slight breaking down on the surface, but it is easy to see that great changes had taken place through the entire thickness of the enamel and deep into the dentin before there was any external evidence of it. Figs. 19 and 20 are more marked than one of the same character which accompanied my former series of papers. The unaided eye could detect nothing on the surface of the tooth from which these sections were cut, beyond the stain which is nearly always

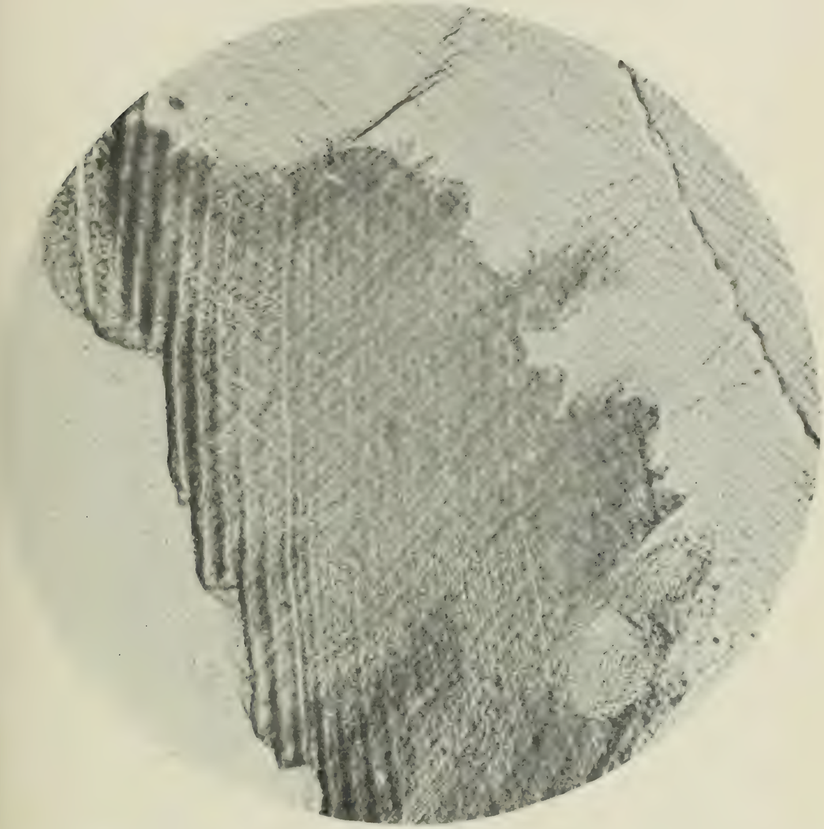
FIG. 22.



Showing the effects of the slow penetration of the enamel by acid of decay.

to be found on the approximal surfaces of teeth, to indicate the profound changes shown in the photographs. The acid has filtered through the entire thickness of the enamel, softening it so that it cuts very easily, and has completely destroyed a considerable area of tissue internally. Figs. 22 and 23 also show large areas of enamel softened by the action of acid. The action of the acid here, although not of the most energetic kind, has evidently been continuous and uniform from the commencement. Note how clearly the lines of stratification, as well as the sections of the enamel-rods, are seen in the areas acted upon by the acid of decay, and how abruptly these appearances end at the line where we meet the sound, normal enamel. The removal of the cement-substance clearly reveals the manner in which the tissue was formed.

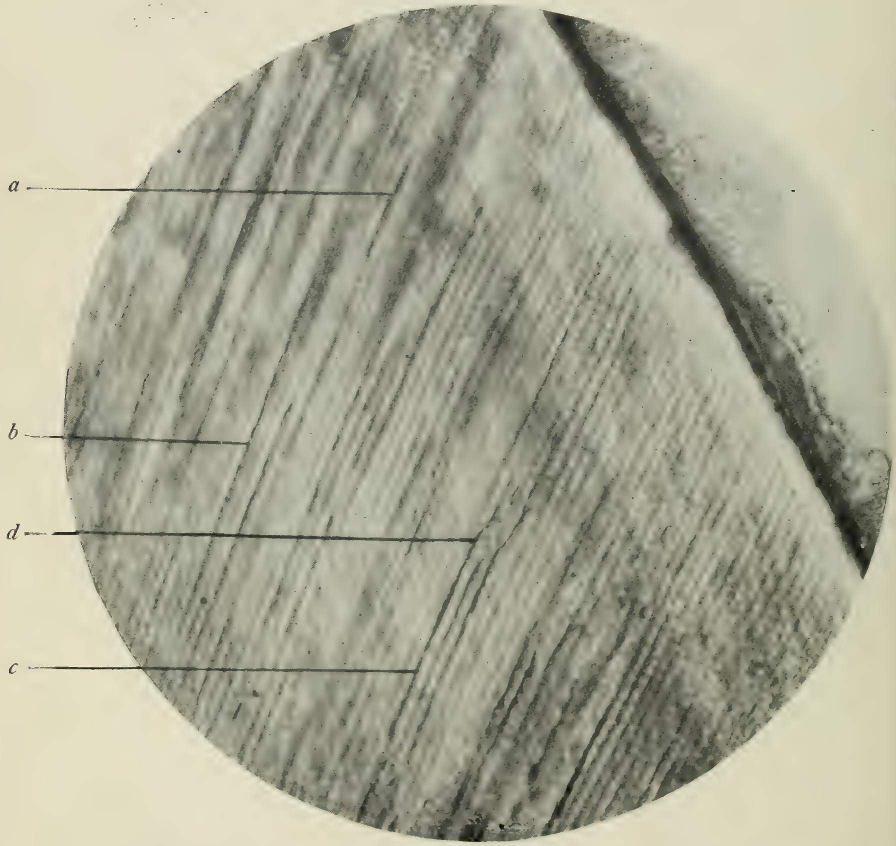
FIG. 23.



Showing the effects of the slow penetration of the enamel by acid of decay.

In cutting into such areas as are shown here there is small reason for wonder that dentists, with no knowledge of what had really taken place, should have concluded that some important vital change had occurred in the enamel, whereby the tissue had been deprived of a portion of its lime-salts. A degeneration and a softening *has* taken place, lime-salts *have* been removed, but, as you now see, this has been caused entirely by external agencies; and thus my *a priori* logical position of long ago, that vital changes cannot occur in the enamel of an erupted tooth, is shown to be in complete harmony with the scientifically demonstrated facts.

FIG. 24.

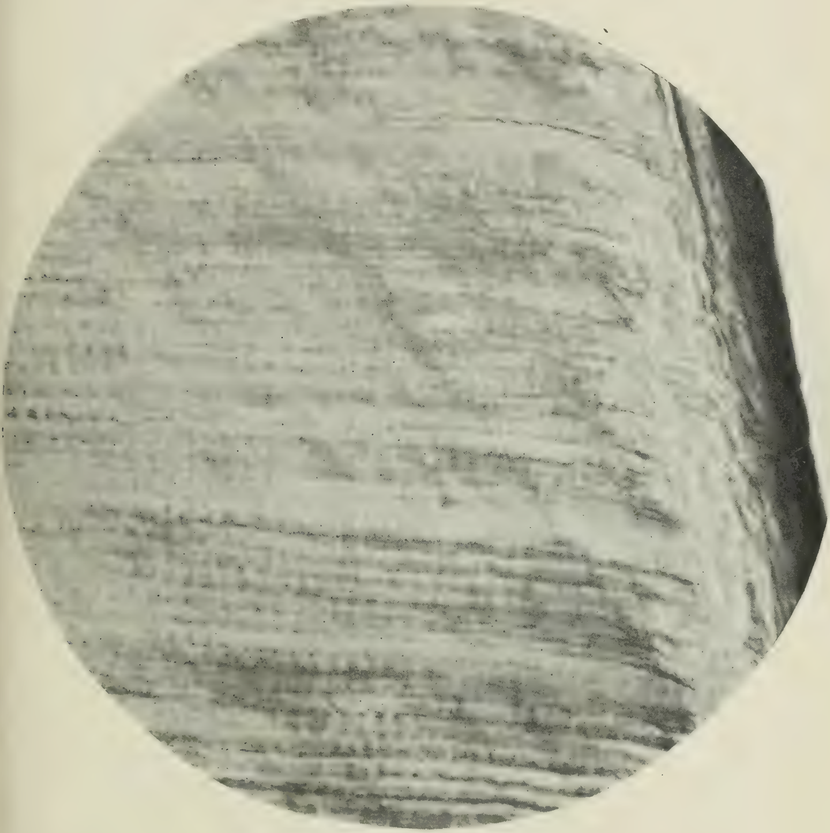


Section of decaying enamel, showing at *a*, *b*, and *c* formation of canals between the enamel-rods by the acid of decay.

At *d*, where the enamel-rods slightly change their direction, the canals are seen to change direction also, thus keeping within the cement-substance.

In connection with the supposed relation between the presence of bacteria at the commencement of decay and congenital defects in enamel, I may at this point call your attention to the fact that bacteria are most frequently found to be acting upon enamel where this tissue is usually most perfect. It so happens that this is true with reference to that portion or zone of a tooth which includes the approximal surfaces. Aside from those coarser imperfections, the crevices and sulci on the grinding-surfaces, defective enamel is most frequently found upon the cusps of teeth, where they rarely decay. This is, of course, purely a coincidence, but it is a coincidence worthy of mention.

FIG. 25.

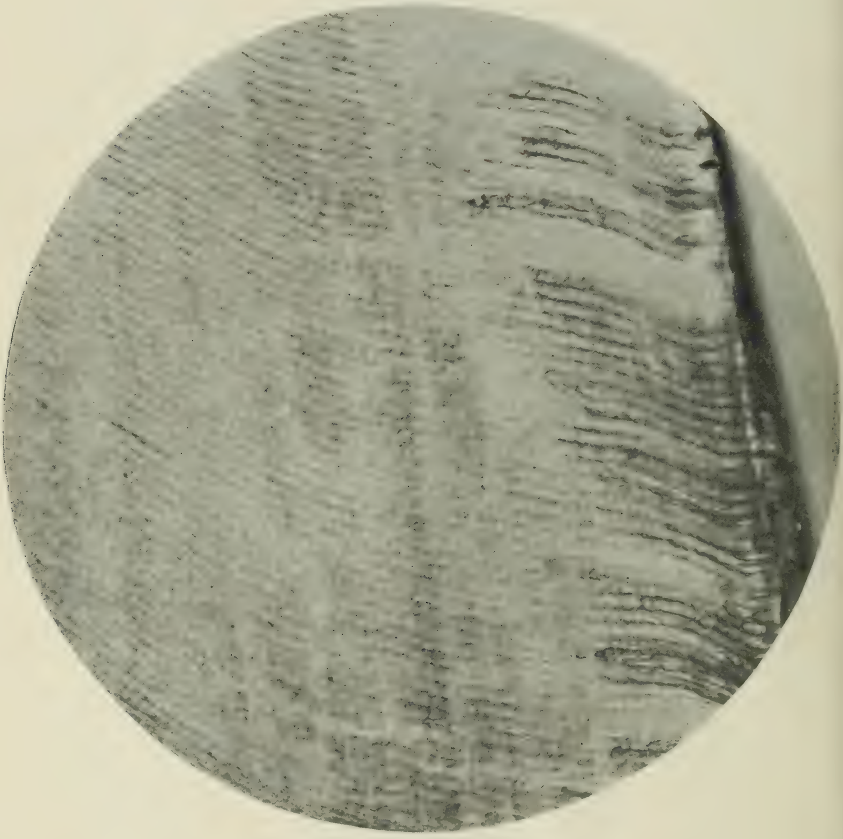


SECTION OF HUMAN ENAMEL. × 600.
Showing solution of cement-substance and formation of canals.

Even with many who are fully cognizant of the rôle which bacteria play in causing decay of the teeth, it has been believed that congenital defects are second only in importance to the microorganisms. Bacteria undoubtedly avail themselves of defects where they exist, but at the same time they act quite independently of all defects. The sheltered situation of an approximal surface, with enamel of perfect structure, is evidently a more favorable condition for decay than almost any form of defect upon the lingual or buccal surfaces of the teeth.

I have frequently referred to the action of the acid of decay as forming canals in the cement-substance between the enamel-rods. There are several very interesting questions relating to the presence of these canals which it may be well to consider a little further. I am convinced that the canals which several observers have seen in human enamel, and referred to as congenital defects, are, in the great majority of cases, the work of bacteria. There are several good reasons for this opinion. Such canals are rarely found in the teeth of wild animals, and in human teeth much less frequently upon the buccal and lingual surfaces than on the approximal surfaces, which are nearly always covered by bacteria. Again, in nearly all instances, as I have previously observed, there

Fig. 26.

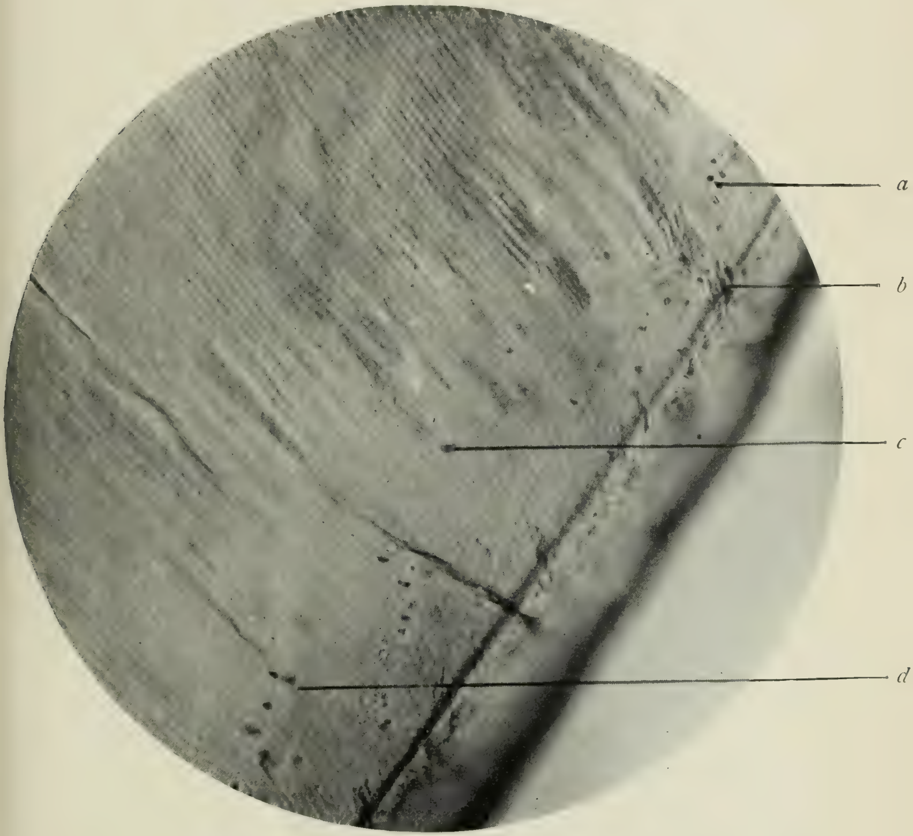


Section of Human Enamel. × 500.

Showing formation of canals near the surface by the acid of decay.

are other and unmistakable indications of the depth to which acid has penetrated in enamel; and these other appearances, when compared with the depth of the canals, are found nearly always to correspond exactly. This is strikingly shown in Fig. 16, and also in other illustrations accompanying this paper. Furthermore, if canals do exist as congenital defects we should, according to the latest researches of Mr. Tomes, expect to find such canals in the substance of the enamel-rod. Now, in the specimens which I am describing this never occurs. In Figs. 24, 25, and 26 the canals are so plainly seen to be wholly in the cement-substance between the rods as to make any further statement on this point almost unnecessary. But I may add that these canals are often considerably larger than the diameter of an enamel-rod, as is shown in Fig. 27, where the section, being ground somewhat obliquely across the

FIG. 27.

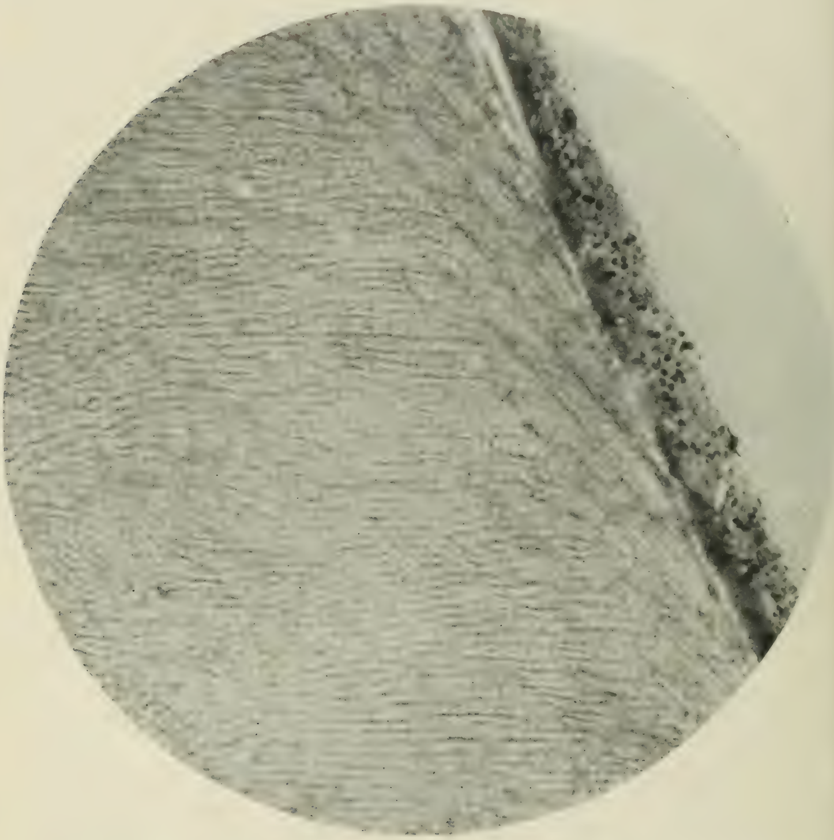


Section of enamel which cuts obliquely across the rods near the surface, and thus shows the opening of the canals at *a*, *b*, *c*, and *d*.

enamel-rods near the surface, has exposed several canal openings. The openings are also very finely shown in Fig. 28, where the bacteria have been torn away, exposing the slightly beveled surface of the section. The diameter of nearly all of these openings is greater than that of an enamel-rod, and eight or ten times greater than the width of the canals in marsupial enamel.

For the benefit of those who still believe that there are fine fibers of organic matter in enamel (from a recent article in the DENTAL COSMOS I see that there are such believers), and that these canals might possibly have contained organic matter, I will repeat what I have previously stated, that there is not the slightest difficulty in demonstrating the presence of organic matter in enamel when it exists. I have many specimens of the tubular enamel of marsupials in which the organic fibers in the tubes are deeply stained,

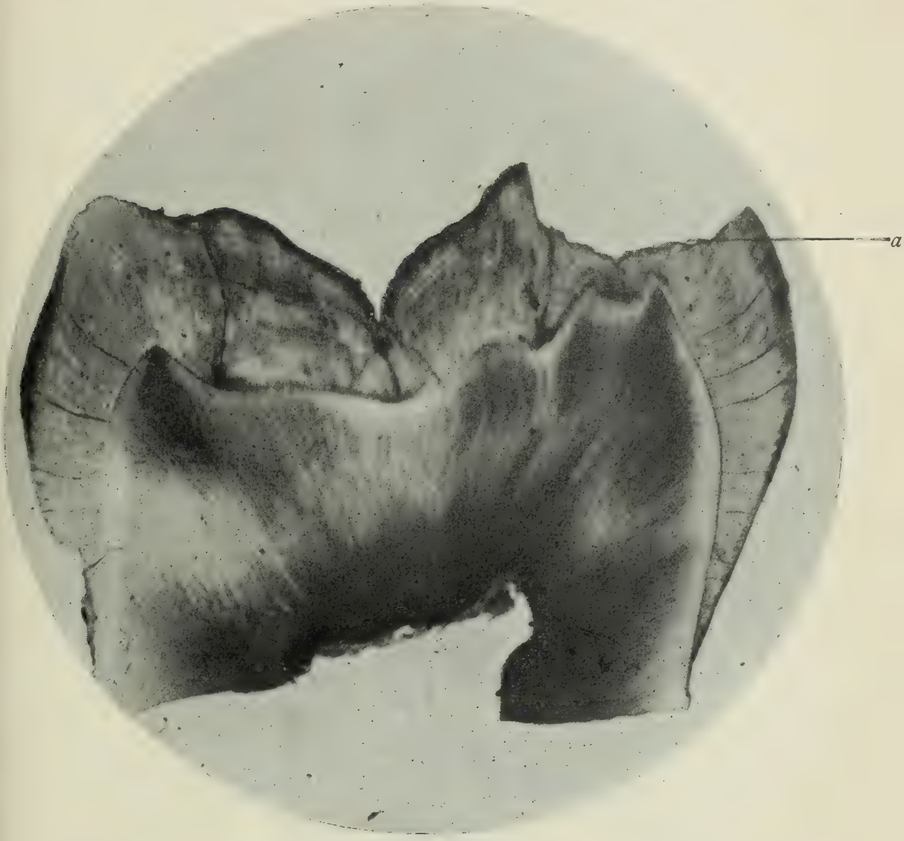
FIG. 28.



Section of human enamel, showing the natural beveled surface with numerous openings of canals.

but in no instance have I ever been able to demonstrate the presence of stainable matter, other than bacteria, in human enamel. The evidence, therefore, seems to be nearly all in favor of the view that none of the canals which I have illustrated and described are due to congenital structural defects or peculiarities, but are produced by the acid excreted by bacteria. That the most of them are so produced is beyond question. In a former paper I published a photograph which showed that the entire surface of a tooth may become covered with bacteria, and the whole enamel covering thus become softened before there is any external cavity formed. Fig. 29 is another illustration of this fact. The extreme point of the outer cusp of this molar was the only place in the section not covered by bacteria. The inner cusp had been broken, and this broken surface was also completely covered with micro-organisms, an enlarged view of which may be seen in Fig. 30.

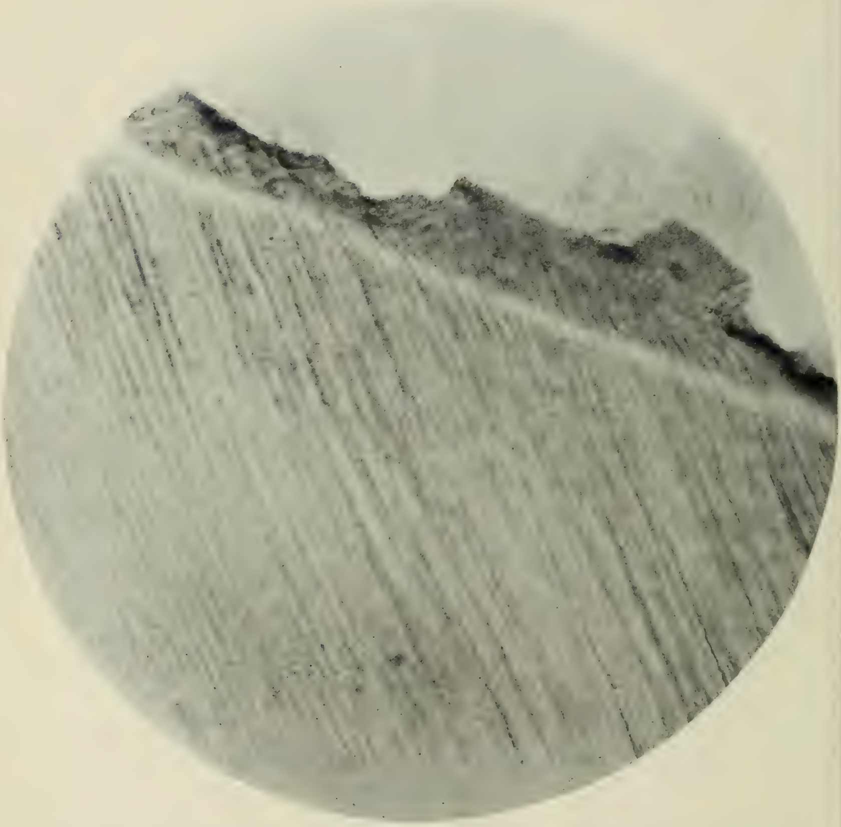
FIG. 29.



From a section of a molar tooth which was nearly entirely covered by a felt-like growth of bacteria.

We have, during the past twenty years, heard a great deal about the incompatibility of filling-materials with tooth-substance, and of electro-chemical action as the cause of the failure of fillings. Some time ago a freshly extracted molar came into my hands which contained a small gold filling that was evidently defective at the margins. I ground a section of this tooth directly through the center of the gold filling. The gold dropped out just before my section was thin enough for mounting, but when in position it extended considerably higher than the points shown at *a* and *b* in Fig. 31. The photograph shows perfectly to what extent the filling was defective. From *c* and *d* downward the enamel was still perfectly protected, but from these points upward a softening of the tissue was in progress. Fig. 32, taken from near *a*, in Fig. 31, and at a point considerably beneath the margin of the filling, shows

FIG. 30.

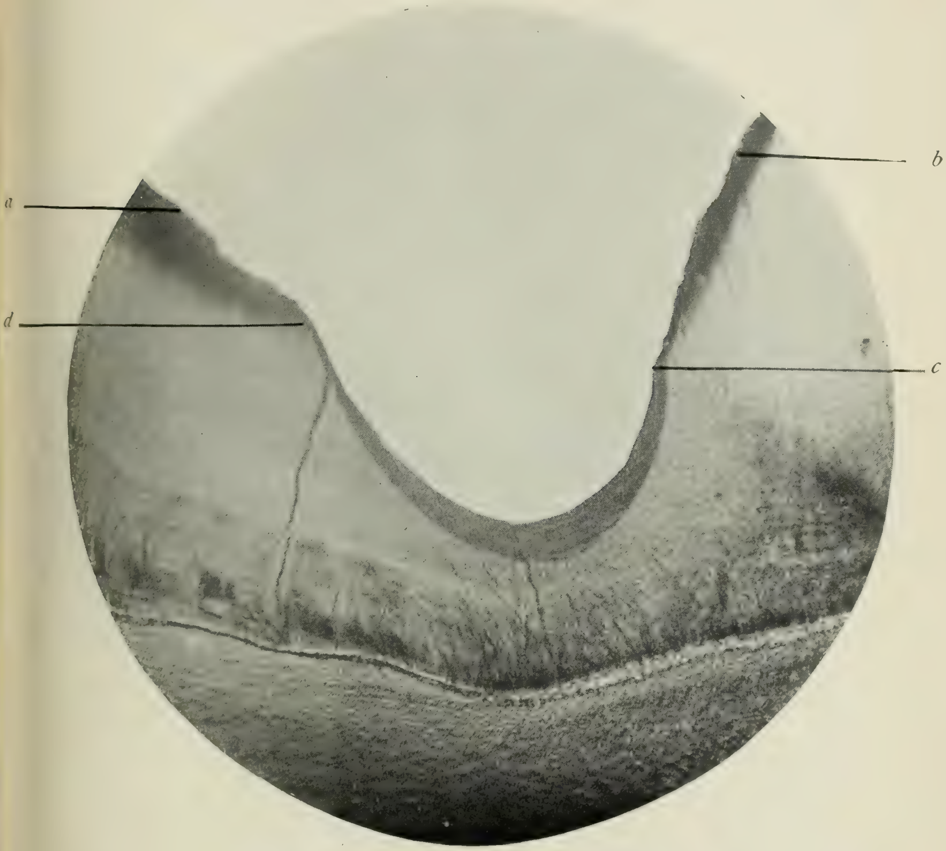


From the region shown at *a* in the preceding illustration. The broken surface is seen to be covered by a growth of bacteria, and canals are everywhere seen penetrating the enamel.

the secret of the "incompatibility" of the filling with the tooth-substance. The filling was probably never mechanically perfect at this point, and a thick mass of micro-organisms had developed beneath the margin, and the work of destruction was in progress. When an entirely adequate cause is present, it seems high folly to go far afield to find a remote one for an explanation.

And now we come back to the bearing of all these facts, which I have been exhibiting to you, on our clinical observations. We see clearly that the long-established belief in the softening of enamel, even when there is no external evidence of decay, is well founded. Enamel which at one time offered great resistance to cutting-instruments may be observed a few years later, to use a somewhat exaggerated but frequent expression, to cut almost as easily as chalk; and these teeth not only cut easily, but, by the ordinary

FIG. 31.

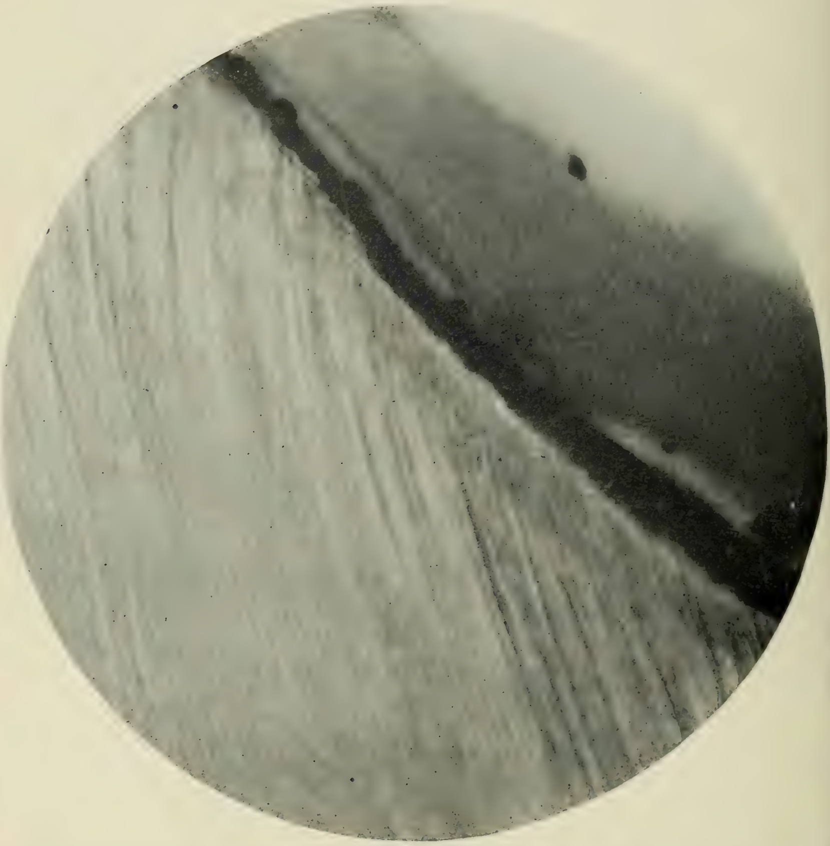


From section through the grinding-surface of a molar tooth. The cavity contained a defective gold filling, *a* and *b*, near margin of filling where bacteria had penetrated.

reflected light in which they are seen, they have a chalky look to the eye. This appearance invariably follows the application of acid to enamel. The deduction from these clinical observations, that some *intra-vitem* change had taken place in the tissue, merely represents the everlasting desire of the human mind for an explanation.

I may add, in this connection, that I regard the claim that the enamel may harden after having once been softened as without the smallest foundation. I say this not alone because an explanation of such a phenomenon seems impossible on *a priori* grounds, but because during more than twenty-five years of clinical observation directed especially toward these questions, I have never been cognizant of a single fact which would warrant such a conclusion.

FIG. 32.



From a region near *a* in the preceding illustration, showing a very thick and matted growth of bacteria which had penetrated beneath the edge of the gold filling.

But I have been observing for many years, for long before I was in possession of any of the facts which I have been presenting in this paper, that the enamel on the rapidly decaying teeth of young persons often seems much harder and more resistant to the action of cutting-instruments than the mature enamel on the slowly decaying teeth of adults. Several years ago I pointed out that there is a certain type of yellow tooth (frequently seen in the mouths of German patients) which, although generally decaying very slowly, is a comparatively soft tooth.

My general conclusions are that all softening of enamel is due to the action of acids, and chiefly or wholly to the acids excreted by bacteria *in situ;* and that while soft enamel and rapid decay, or hard enamel and slow decay, may be observed coincidently, the opposite conditions may also be seen. In other words, although there are marked variations in the resistance of different enamels to cutting-instruments, these variations bear no necessary relation to decay or immunity from decay. But it is quite possible that observation may demonstrate some relation between certain types of teeth and certain general systemic conditions which are favorable to the development and activity of the micro-organisms causing decay.

There are some very practical questions growing out of these conclusions, the most important of which has reference to the extent to which softening and decay of enamel may be prevented by the use of germicides. My own opinion, based on an experience extending over five years, is that we can place in the hands of our patients the means for preventing at least two-thirds of the dental decay now prevalent. This, of course, presupposes that the patients will do their part of the work well and faithfully. We have here, you will all admit, matter for serious consideration. In addition to the prophylactic measures suggested, the facts demonstrated call for more free cutting and thorough polishing of the enamel-margins of cavities, and especially for the use of antiseptic varnishes and cements for the lining of all cavities.

# FORMALDEHYD AS A PRACTICAL DISINFECTANT FOR INSTRUMENTS.*

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(From Laboratory of Hygiene, University of Pennsylvania.)

In 1868 Von Hoffmann generated from wood alcohol a gas to which was given the name formaldehyd. A thirty-eight to forty per cent. solution of this gas in water constitutes commercial formalin. The substance also occurs as a solid in the polymerized form—Paraform.

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*This work was undertaken at the request of Dr. Edward C. Kirk, dean of the Department of Dentistry, University of Pennsylvania. I wish to express my thanks to Dr. Kirk, who furnished the apparatus for the experiments, and through whose kindness I was able to obtain material from the clinics.

Within the past five years these preparations have been attracting no little attention in the field of disinfection. To be sure, there has been a marked discrepancy in the results obtained by various workers; some crediting formaldehyd with little, if any, disinfecting power, while others enthusiastically hail it as the ideal germicide. Under these circumstances one is prone to ask, To what extent can we rely upon this substance to destroy undesirable bacteria? Beyond any question, formaldehyd is a good surface disinfectant, as shown by the work of Roux and Trillat (1), Vaillard and Lémoine (2), Bosc (3), Pfuhl (4), Aronson (5), Harrington (6), and many others.

There can be no doubt, from the evidence offered from time to time, that the mouth is often the source of general systemic infection, and, accordingly, there is every reason why the dental surgeon should be as aseptic with the articles he employs as is the general surgeon. Certain infective bacteria, the pyogenic organisms, for instance, are frequently present, while at times, in the sputum and secretions of the mouth, are to be found the organisms of diphtheria, pneumonia, tuberculosis, and even syphilis (whatever that may be). Starck (7) reports the presence of the tubercle bacillus in carious teeth. An instrument once dipped in this undesirable but too frequently present material in the mouth of one patient offers a menace to the health of the next occupant of the chair, since bacteria are no respecters of persons or places.

Realizing that the present methods of disinfection practiced by dentists are in many cases insufficient in themselves, or improperly carried out by the operators, there has been a desire for a method combining efficiency with such simplicity of manipulation as to leave no excuse for the use of infected instruments by even the careless worker.

Hot water properly used is doubtless satisfactory as a disinfecting agent, but too frequently care is not taken to have the water hot enough and the period of contact with the instrument long enough; and, moreover, the usefulness of edged tools is seriously impaired by exposure to the temperature of boiling water.

With chemical solutions there is too great tendency to merely dip the instrument into the liquid and then wipe it dry. This instantaneous process may be of value in mechanically removing some of the foreign matter, but as a process of disinfection it is not always a success.

G. de Schweinitz (8) recommends immersion of ophthalmic instruments for twenty minutes in ninety-eight to ninety-nine and nine-tenths per cent. alcohol, and then rinsing in sterile water; but Randolph (9) in testing this method found a growth in five out of one hundred tubes inoculated from seventy-five instruments and twenty-five nails. In a second test Randolph inoculated the instruments with pus-producing organisms, and found the alcohol sterilized but fourteen per cent. of them.

The four ways in which formaldehyd is used as a disinfectant are as follows: 1, formalin; 2, the vapors arising from spontaneous evaporation of formalin; 3, generation of the gas from methyl alcohol by incomplete combustion; 4, generation of the gas from paraform by heat.

Eschelman (10) says, "I have been using a two per cent. solution [of formalin] for the last three months and like it very much. It does not blacken nor corrode them" [dental instruments].

E. A. de Schweinitz (11), testing the disinfection of ophthalmic instruments by the first method, found an exposure of thirty-five minutes necessary in a 1 : 2000 solution, or ten minutes in a 1 : 1000 strength. In the second method, with the vapors from a shallow dish of formalin in a closed copper drying oven, he found disinfection complete in thirty minutes, provided the formalin had been placed in the oven some hours previously. But he says infected instruments wiped with cotton were not disinfected by a ten-minute exposure in this atmosphere, unless rinsed in water before wiping, and then exposed for ten minutes.

Bierring (12) used formaldehyd gas generated from wood alcohol by a No. 1 Hollister generator, the chimney of which fitted in an opening into a metal hot-air sterilizer of 2752 cubic inches capacity. After an exposure of ten minutes in this way he obtained a growth from all instruments, while after thirty minutes' exposure growths resulted only from spore-forming organisms, or from organisms protected by four thicknesses of an apron. He concludes that as a sterilizing agent for surgical purposes an alcohol gas generator may be used for instruments only, with an exposure of at least thirty minutes, when confined to a space not exceeding two and one-half cubic feet.

Reik and Watson (13) report adversely on the disinfection of instruments with vapor of formalin under two and one-half hours' exposure, but with formaldehyd generated from paraform by a satisfactory lamp they found instruments could be sterilized in a small chamber in from ten to fifteen minutes, using respectively five and three grains of paraform to the cubic foot of space.

For various reasons, the fourth method stated above seems the desirable one, and it was to determine the practical value of this method of disinfection for dental instruments that our work was undertaken. We employed the gas generated by heating over an alcohol lamp a pastil which contained five grains of paraform. The lamp was placed in a tin box of nearly one cubic foot capacity. This box was tight when closed, as shown by the fact that only a very slight odor was discernible near the closed box, while a strong odor was present when the door was opened.

Among the instruments employed in the tests were various chisels, excavators, and burs. These were boiled, shown by cultural methods to be sterile, then either dipped into bouillon cultures or infected from selected cases found in the operative clinic of the Department of Dentistry, University of Pennsylvania. After infection each instrument was placed in a sterile tube and kept at incubator temperature (37.5°C.) for three hours, as Pfuhl (14) says dried cultures are more difficult to kill than moist ones, with which statement Harrington (6) and de Schweinitz (15) agree. In a single test with moist instruments we found sterilization complete. After the infection and subsequent drying the tubes containing the infected instruments were separated into two lots, one to be subjected to the method of disinfection and the others to be kept as controls, by which would be shown that no step other than the action of formaldehyd destroyed the vitality of the germs. The cotton plugs were removed from the tubes containing the instruments to be disinfected, the tubes placed on wire racks* in the disinfecting chamber, the alcohol lamp lighted and placed in the chamber, when a pastil was dropped into the cup above the flame and the door of the chamber closed.

After exactly ten or fifteen minutes, according to the experiment, the door was opened and the instrument quickly removed, in order to make the time accurate. Each instrument (controls likewise) was placed in a considerable amount of sterile bouillon and these cultures, together with the subcultures made from them, observed for at least one week, as recommended by the Committee on Disinfection, American Public Health Association (16). The disinfecting chamber was opened and freely aired after each experiment. No injury to any of the instruments from the effects of the gas was observed, which agrees with the statements of Eschelman (10), de Schweinitz (11), Burnett (17), and Reik (18). In all experiments a free growth developed from the controls. After an exposure of fifteen minutes the only growth obtained ($g^2$) was a pure culture of an organism not found in the control ($g^1$). It evidently was an accidental air infection, which, moreover, was readily killed by a subsequent similar exposure. After an exposure of ten minutes growths were found only in the more resistant germs,—viz, *Staphylococcus pyogenes aureus* and *Bacillus anthracis*. Each of these resisted disinfection twice out of six times in an exposure of ten minutes. The disinfection of instruments purposely infected in the clinics from cases of caries, pyorrhea, and gingivitis was satisfactorily accomplished in every case.

In experiment 4 a comparative test was made to see if enough formaldehyd remained on the instruments to act as an antiseptic in even the quantity of bouillon used, and thus prevent development there. This was done by making two groups of the instruments. The details of the test were identical for the two groups, except that the instruments of the second group were washed two or three minutes in a one per cent. ammonia solution just after the application of the formaldehyd,—*i.e.*, just previous to the inoculation of the bouillon with them. The controls (4b) which were washed in the ammonia exhibited just as vigorous a growth as the controls (4a) not subjected to the ammonia treatment, showing that the ammonia had no deleterious effect.

We conclude that infected dental instruments can be disinfected without injury in a closed space of less than one cubic foot, by an exposure of fifteen minutes to the formaldehyd gas generated from a pastil containing five grains of paraform, by heating the pastil over a proper alcohol lamp.

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*In part of the experiments the instruments were taken from the tubes and laid directly on the racks, but no difference in result was noticed, the gas freely entering the open tube as one would expect.

The results of our experiments are appended in tabulated form. Growth = +. No growth = o.

*Experiment 1.* Time of exposure, 15 minutes.

| Infection. | Designation. | Result. |
|---|---|---|
| Aureus culture | $a^1$ control. | + + in 1 day. |
| “ “ | $a^2$ | o in 10 days. |
| “ “ | $a^3$ | o “ “ “ |
| Diphtheria “ | $b^1$ control. | + + in 1 day. |
| “ “ | $b^2$ | o in 10 days. |
| “ “ | $b^3$ | o “ “ “ |
| Streptococcus culture | $c^1$ control. | + + in 1 day. |
| “ “ | $c^2$ | o in 10 days. |
| “ “ | $c^3$ | o “ “ “ |
| Osteitis from tooth-infection following extraction | $d^1$ control. | + + in 1 day. |
| “ “ “ | $d^2$ | o in 10 days. |
| Pulp-canal, putrefactive contents, upper bicuspid | $e^1$ control. | + + in 1 day. |
| “ “ “ | $e^2$ | o in 10 days. |
| Anthrax culture | $f^1$ control. | + + in 1 day. |
| “ “ | $f^2$ | o in 10 days. |
| “ “ | $f^3$ | o “ “ “ |
| Pyorrhea alveolaris from pus pocket chlorotic female | $g^1$ control. | + + in 1 day. |
| “ “ “ | $g^2$ | + in 1 day.* |

*Experiment 2.* Exposure 10 minutes. All controls gave free growth in one day.

| Infection. | Designation. | Result. |
|---|---|---|
| Pulp case | $a^1$ control. | + + in 7 days. |
| “ “ | $a^2$ | o “ |
| Caries | $b^1$ control. | + + “ |
| “ | $b^2$ | o “ |
| Local gingivitis pyorrhea | $c^1$ control. | + + “ |
| “ “ “ | $c^2$ | o “ |
| “ “ “ | $c^3$ | o “ |
| Typhoid culture | $d^1$ control. | + + “ |
| “ “ | $d^2$ | o “ |
| “ “ | $d^3$ | o “ |
| Diphtheria “ | $e^1$ control. | + + “ |
| “ “ | $e^2$ | o “ |
| “ “ | $e^3$ | o “ |
| Aureus “ | $f^1$ control. | + + “ |
| “ “ | $f^2$ | o “ |
| “ “ | $f^3$ | + in 2 days. |
| Anthrax “ | $g^1$ control. | + + in 7 days. |
| “ “ | $g^2$ | + in 1 day. |
| “ “ | $g^3$ | + “ |
| Streptococcus culture | $h^1$ control. | + + in 7 days. |
| “ “ | $h^2$ | o “ |
| “ “ | $h^3$ | o “ |

---

*This growth was a pure culture of an organism not found in $g^1$. It was doubtless an air infection, and was killed by a second similar exposure.

*Experiment 3.* Exposure 10 minutes. Controls gave free growth in one day.

| Infection. | Designation. | Result. |
|---|---|---|
| Typhoid culture | $i^1$ control. | + + in 7 days. |
| “ “ | $i^2$ | 0 “ |
| “ “ | $i^3$ | 0 “ |
| Diphtheria “ | $j^1$ control. | + + “ |
| “ “ | $j^2$ | 0 “ |
| “ “ | $j^3$ | 0 “ |
| Aureus “ | $k^1$ control. | + + “ |
| “ “ | $k^2$ | + in 2 days. |
| “ “ | $k^3$ | 0 in 7 days. |
| Anthrax “ | $l^1$ control. | + + “ |
| “ “ | $l^2$ | 0 “ |
| “ “ | $l^3$ | 0 “ |
| Streptococcus culture | $m^1$ control. | + + “ |
| “ “ | $m^2$ | 0 “ |
| “ “ | $m^3$ | 0 “ |

*Experiment 4.* Exposure 10 minutes. Controls gave free growth in one day.

*a,* Instruments not washed in one per cent. ammonia.

| Infection. | Designation. | Result. |
|---|---|---|
| Aureus culture | $a^1$ control. | + + in 7 days. |
| “ “ | $a^2$ | 0 “ |
| Anthrax “ | $b^1$ control. | + + “ |
| “ “ | $b^2$ | 0 “ |
| Typhoid “ | $c^1$ control. | + + “ |
| “ “ | $c^2$ | 0 “ |
| Diphtheria “ | $d^1$ control. | + + “ |
| “ “ | $d^2$ | 0 “ |

*b, All* instruments washed in one per cent. ammonia solution just previous to making cultures from them.

| Infection (same as 4 a). | Designation. | Result. |
|---|---|---|
| Aureus culture | $a^3$ control. | + + in 7 days. |
| “ “ | $a^4$ | 0 “ |
| Anthrax “ | $b^3$ control. | + + “ |
| “ “ | $b^4$ | 0 “ |
| Typhoid “ | $c^3$ control. | + + “ |
| “ “ | $c^4$ | 0 “ |
| Diphtheria “ | $d^3$ control. | + + “ |
| “ “ | $d^4$ | 0 “ |

## BIBLIOGRAPHY.

1. Roux and Trillat. *Annales de l'Institut Pasteur,* 1896, No. 5, p. 283.
2. Vaillard and Lémoine. *Ibid.,* No. 9, p. 481.
3. Bosc. *Ibid.,* No. 5, p. 298.
4. Pfuhl. *Zeitschrift für Hygiene,* xxiv, 289.
5. Aronson. *Ibid.,* xxv, 168.
6. Harrington. *American Journal Medical Sciences,* 1898, January.
7. Starck. *Münchener Medicinische Wochenschrift,* 1896, No. 7.
8. G. de Schweinitz. Text-book on Ophthalmology, 1897.
9. Randolph. Johns Hopkins Hospital Bulletin, 1896, September-October.
10. Eschelman. DENTAL COSMOS, May, 1898, p. 344.
11. E. A. de Schweinitz. *Journal American Medical Association,* 1898, January 8.
12. Bierring. *Ibid.,* April 30.
13. Reik and Watson. Johns Hopkins Hospital Bulletin, 1897, December.

14. Pfuhl. *Zeitschrift für Hygiene,* xxii, 339.
15. E. A. de Schweinitz. *Charlotte (N. C.) Medical Journal,* x, 165.
16. *Journal American Public Health Association,* January, 1898, 107.
17. Burnett. *Ophthalmic Record,* v, 310.
18. Reik. Johns Hopkins Hospital Bulletin, 1898, April.

# PYORRHEA ALVEOLARIS—WITH SOME NOTES FROM THE PRACTICE OF THE AUTHOR.

BY A. W. HARLAN, A.M., M.D., D.D.S., CHICAGO, ILL.

(Read before the New York Odontological Society, March 15, 1898.)

It is no part of my plan to-night to read extracts from the papers of other writers for your benefit, as you have the same means of access to them that I have, and if you have not availed yourselves of the privilege it is no fault of mine.

We have been told that the ancients suffered from loosening of the teeth, and from recession of the gums and the wasting of alveoli; in fact, I have read somewhere that evidences of these facts have been seen by living human eyes when looking at the skulls of mummies and other cheerful specimens of bygone generations of men and women. I have seen these subjects in Washington, Cambridge, and elsewhere, so that I know that the ancients must have suffered in this way when mercury was not used as a medicine and salt pork was not an article of daily diet. Indeed, I believe that port wine or beer was not the ordinary daily beverage of some of the savages of bygone times.

So far as I know, women did not use sewing-machines, huddled close together in ill-ventilated rooms, nor did the men of those days chew tobacco or smoke pipes, or do book-keeping with electric lights to take the place of sunshine. There were no sleeping carriages, nor steam heat, nor razor-pointed shoes; then those people lived before there were dyspepsia pills or patent cures for gout or rheumatism. They did not have the blessed privilege of choosing from dozens of proprietary medicines, warranted to destroy various pus-producing cocci, whether they were prefixed with "staph" or "strep," or some other new-fangled way of distinguishing them from others that are not pathogenic.

There were no forceps or separators, or floss silks, or files, or dental engines, or tooth-brushes. Malnutrition and chewing-gum had not been heard of, and the uric acid diathesis was not even dreamed of. People of those ancient times suffered from loose teeth and socketless teeth just the same, and still they were deprived of the valued service of stomatologists, dentists, and oral surgeons. The delicate needles of gold, platinum, and steel, with the aseptic plungers, were not invented then, nor did our forefather dentists need them, as the slender push-and-pull scalers had not been evolved. There were no local and few general anesthetics, so that all they had to rely upon were astringents and detergents for laving their mouths.

Men and women lived close to nature in those remote ages, but, in spite of these facts, teeth became loose, and have continued to loosen until the present time. If we could only summarize all of the causes of loosening of teeth it is doubtful, even now, if we could in one or two short generations totally prevent such a disaster to the human race.

I have no new theory to present to you to-night, because I am not sure that the same causes are universal throughout the United States. In the mountains, where dampness does not exist and microbes do not thrive, the varieties of looseness of the teeth are not the same that we see on the borders of a great lake or in the lowland, where miasms flourish and people suffer from intermittent fevers and rheumatism.

In cosmopolitan cities, like New York, Philadelphia, and Chicago, where the racial characters are so numerous, we must seek for different causes, largely influenced by hereditary tendencies. The robust out-door workers, both men and women, do not seem to be so often attacked by loosening of the teeth as those whose occupations confine them to in-door life. Many of the prevalent diseases, like typhoid, the various forms of catarrhal and other inflammations of the mucous membrane, perhaps do, in many instances, furnish suitable fields for the ravages of the particular coccus which invades the territory surrounding the neck of the tooth.

The administration of medicines, frequently not suited to a case, may be responsible for much of the irritation and consequent detachment of the pericementum from the neck of the tooth. It is certain that many cases of loosening are due to a crowded condition of the teeth, and it is equally certain that many others are due to the unwise extraction of teeth and the fitting of partial dentures to the mouth not suitable as substitutes for the teeth already lost. Badly made contour fillings, and those improperly finished, are a frequent cause of the detachment of the gingival margin of the gums; neglect, uncleanliness, the formation of salivary deposits, pernicious habits of eating and drinking, lack of exercise, the abuse of toothpicks and thread, disks, files, clamps, and poorly fitting separators and regulating appliances, all have something to do with the inception of the initial lesion.

I am not one of those who believe that gout and rheumatism can be regarded as potent factors in causing loosening of the teeth. All loose teeth are not incrusted with deposits on their roots. Many, it is true, have deposits on them, but not all. In framing a system of treatment each case must be studied for the cause, and, if it be found, the prognosis may be favorable or not, as the history of the case will disclose.

Too little attention is paid to the care of the teeth of families by the dental surgeon himself. Incipient pyorrhea is not checked soon enough, and sooner or later the practitioner is brought face to face with a condition of things not desired or easily controlled by him. We find that our regular systematic clientèle are not the frequent sufferers, but those migratory people who are never satisfied with the conscientious care of a family dentist, but who flit from office to office for reasons of their own, until gradually their teeth are all, or nearly all, in a hopeless state of chronic looseness. (Some do not consult a dentist at all until their teeth are hopelessly loose.)

I do not think it proper to consider syphilis as an etiological factor in producing looseness of the teeth, although perhaps a small percentage of the cases seen may be traced to such a cause or to the heroic medication of the patient during the active stages of this disease.

It seems to me that Witzel was nearer right in calling loosening of the teeth "infectious alveolitis" than any of our modern authors.

In presenting these thoughts to you I am not unmindful of the strong claims to a name presented by Magitot, "symptomatic alveolar arthritis;" Black, "phagedenic pericementitis," and the late Dr. Riggs, "Riggs's disease;" Ingersoll, "alveolar ulceration," and Wedl, "pyorrhea alveolaris." A few names have been presented by other authors, but for our present purpose we incline to the latter as more fully expressing what is meant by an author when he talks of ulceration of the socket and coincident loosening of teeth. "What's in a name?" Is it not true that many of the causes of loosening of teeth already mentioned are grouped together in one mouth, and the patient may at the same time be suffering from some intercurrent malady not responsible for the appearances of the gums? Some of the lesions of the gingivæ are so simple, if seen in the beginning, that little or no treatment will cause them to disappear; and still if one or more teeth are missing we find some of them migrating for support against a more firmly fixed tooth, aided frequently by abnormal mouth-breathing, which is a potent factor in loosening, yet little regarded in many cases. Any cause, obesity, occluded or malformed nasal passages, or growths in the post-nasal region, will be sufficient to induce mouth-breathing. In such cases the teeth spread and project, and pockets are formed around the roots, usually on the lingual aspects at first, but later they are seen encircling the whole root.

When my attention was first drawn to the loosening of teeth, in a constantly growing practice, about 1878, I began a series of observations as to the causes most prominently concerned in bringing about such phenomena. I was very soon impressed with the idea that the mere deposit of the so-called salivary deposit had little to do with what we deem pyorrhea alveolaris. It is true that many teeth are loosened and lost from accumulations of tartar or calculi on the tooth, roots, and crowns, but we do not find deep pouches or pockets alongside the roots when such deposits alone are found on the teeth. The removal of such deposits, the use of astringent and stimulating washes, will soon re-establish a good color and firmness to the gums. That heredity played an important part in the causation of looseness of the teeth became firmly fixed in my mind; that we could not ascribe all loosening of teeth to one or two causes, the abuse of liquors, a salt meat diet, mercury, and not even to gout or rheumatism, or both, could we ascribe even a small percentage of these cases; this is true at least in Chicago, where all of my labors have been confined. The mere fact of a tooth being deprived of the pulp is not cause sufficient for the tooth to become loose; indeed, its destruction in many cases is imperatively demanded to permit the tooth remaining in the mouth. As I was unable to group causes to cover all cases, I concluded to study them individually, with the following results:

First, mercurial stomatitis. In all of these cases there is a symmetrical detachment of the peridental membrane, which yields to a treatment of cleansing the roots and the injection of trichloracetic acid every second day around the individual tooth, and the frequent use of a boro-glycerol solution, ten per cent. in water.

Second, syphilis. Thorough removal of the deposits and a potassium chlorate solution, five per cent. in water, used frequently, five to ten times daily, and the administration of ten-grain doses of potassium iodid three times daily, after meals, in peppermint water, is generally all that is required. In all other cases the general rule is to remove deposits and necrosed bone thoroughly, and then inject the pouches or pockets with, first, for one week, a bichlorid solution, one to one thousand, made with hydrogen peroxid, say one grain to two ounces of the peroxid, and five grains of tartaric acid. Later I use at first a strong solution of trichloracetic acid for two or three visits, about five to eight per cent. in distilled water. When I find that the case is doing well, say at the end of two or three weeks, I begin to use about a five per cent. solution of alumnol, in water, to which is added about three per cent. of resorcin.

I usually flavor this with oil of wintergreen to render it pleasant to the taste (any other oil will do). I inject this every other day or every third day, until the pockets are closed with a new growth. Where there is no necrosis of the process I use the zinc iodid solutions, one to three per cent. in distilled water. The patient must use, during the whole course of the treatment, either a hydronaphthol wash or boro-glycerol mouth-wash from five to ten times daily.

The hydronaphthol wash is made as follows:

Hydronaphthol, gr. xx;
Alcohol, oz. iii;
Oil cassia, min. iii;
Water distilled, oz. xx. M.

S.—Dilute with water if necessary.

Or a boro-glycerol wash, one ounce to twenty of distilled water. Frequent massage of the gums is recommended. Loose teeth are banded with pure silver, or silver ninety-five parts and gold five parts. Pure water is recommended, and frequent bathing is insisted upon, except in the case of the extremely aged. Personal habits of moderation are advised in all things, especially in eating and drinking. I regard a perfect occlusion as important, and accomplish this by grinding the teeth when it is demanded.

Any intercurrent constitutional malady is left to the medical adviser.

The above treatment, if persisted in faithfully for three months, will generally effect a cure. If it does not, I allow the patient to go for a month, and recommend and give the case a second period of this vigorous treatment for another three months. At the end of that time the subject will appreciate the necessity for following your directions, and with his co-operation the case will yield gratifying results.

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# "WHAT IS IT?"

BY J. FOSTER FLAGG, D.D.S., SWARTHMORE, PA.

(Read before the Seventh District Dental Society of the State of New York, April 25, 1898.)

To the members of the Seventh District Dental Society of the State of New York—Greeting:

In response to the kind invitation of your committee, I am moved to send you a few lines exactly the reverse of such as I spoke to our Jersey "Hornets" in the month of January last.

I then said that I brought them nothing for discussion, as what I had to leave with them was a statement of *facts* which, while they would not evoke discussion, would, I hoped, become subjects for serious thought and perhaps determined action.

Now all is different. I come to you with the question that has been asked of me full fifty times during the last two years by letter and by word of mouth, and *never* with one word of answer volunteered!

"What is it" that is causing the peculiar and yet evident *unrest* in the ranks of dentistry?

"What is it" that has given rise to the bitter antagonism of organizations and individuals, each of which and every one of whom professes to be—*and ought to be*—working for the "good of dentistry"?

"What is it" that has ended (so far) in the dissolution of the American Dental Association as an institution which had "outlived its usefulness"—and the formation of another *experiment?*

"What is it" that gives the slightest hope—much less the *promise*—of increased usefulness in that organization which it was actually proposed (or rather strangely not agreed to) to call "The National Association of Stomatology"?

"What is it" that permits the filling of the pages of our journals with matter so far above the attention or comprehension of the "average dentist" as to make the *advertisements* the matter of real interest and value; and which the "highly educated," the "earnest workers," those whose health is ruined and whose bodies are emaciated from their midnight vigils for the good of their beloved "specialty of medicine," only read to criticise, to quarrel over, and to antagonize?

"What is it" that is stirring up the waters of the great deep in the extended "agitation of the amalgam question," with all its "scientific" chemical concomitants; its pages of intensely *un*interesting tabulations; its resurrection of long ago and oft-told experiments, and its "mountain labors" with its "mousey births"—and all this *because* of the generally *unsatisfactory* record of its work?

*Having been* "TRIED AND FOUND WANTING" *by large numbers of respectable practitioners, why not let it sink, of its own worthlessness, into the dark abyss of complete oblivion?*

"What is it" that calls for the issue of such "Text-Books" as have appeared of late, full of re-hash; full of shortcomings; full of indefinite and undetermined microbism; full of teachings proven to be erroneous fifty years ago; full of statements either confusing or absolutely incorrect—and these "reviewed" from the Atlantic to the Pacific, as "epoch-making works;" as books which "will be indorsed by the National Association of Dental Faculties" to be used in all the dental schools throughout America—as work done upon *each subject* "with conscientious care"?

Is it that the reviewers *do not know*—or is it that "altruistic courtesy" takes precedence over professional veracity!—What is it?

"What is it" that has been the *incentive* to so-called "leaders in dental thought" for their *united* and unstinted expressions of admiration and indorsement of such pretended "investigations of teeth and filling-materials" as have filled our leading journals by the *hundreds of pages*, extending over the two years of '95 and '96, beginning with the most absurdly unfounded premise and ending with "expectations" which have not in the least degree been realized?

And yet learned men—men of Cosmos-politan and International reputation; of Electro-financial *possibilities* (?), of those working under "Board of Regents" auspice, all, all have joined to swell the chorus of "admirable," "magnificent," "astounding," "paralyzing," *ad nauseam* until it seems that

"Angels rush in where fools do fear to tread!"

Is it for us to imagine for one moment that the "accurate and scholarly" editors and deans *do not know?* This would be to accredit them with a degree of imbecility which it is impossible to assume; and yet, then, "What is it?"

And when "reviews" are asked and given—see *International Dental Journal*, December, 1897—such a peculiar record is found as almost compels one to doubt one's own senses.

"What is it" that makes any one "surprised" that the relative proportion of lime-salts in good and bad teeth is the same?

Upon what authority does any one suppose that there ever was any difference? Upon what *proof* rests the reviewers' *assertion* that the research is a "solid contribution to knowledge"? Where is its solidity?

"What is it" that makes the reviewers "hesitate," and talk of "profound thought" and "value" and "magnitude" as regards this contribution when "there is *still something wanting to make it harmonize with the experiences of our oldest and best tried practitioners*"?

If this is the case, why not go at it in manly fashion, not as though with gloves, afraid lest the touch of the animal should be instant death to the foolhardy reviewer?

If the conclusions are contrary to all clinical experience and are NOT what everybody KNOWS to be true, what right has the so-called investigator to be known as a "scientist," unless it be that the funny man's definition be accepted:

"Scientist"—one who theorizes, and whose theories are found to be incorrect.

And now for the funniest and mildest and sweetest of all—as "it must be remembered that original investigation leads to mental activity, and however erroneous the conclusions may appear to be, they induce to active thought and further work, and finally the truth is established"—and, as the result of some thirty pages of matter, it is the "sincere belief" of one that if these investigations are continued this investigator "will discover facts *verifying our clinical observations!"* (The italics are mine.) Surely a *peculiar* "*belief*," for he would then discover that his "conclusions" had been all wrong, and that his work had amounted to *just nothing at all!* (See page 811.)

And all this "reviewing" is confined to one portion of the "work."

"What is it" that deters all the gentlemen from aiding in the grand and scientific stirring up of that important part of the business, the CONSIDERATION OF THE "AMALGAM QUESTION"?

HERE is something *tangible.* It is something which is *ostensibly* practical. As presented, it is one of the most remarkable Lymphatico-Bilio-Nervous monuments of "up-to-date" dentistry. It has been said (I think blasphemously) that "it marks a *new departure* in dental practice!" That it "is likely to serve as a milestone in the future progress of dentistry!"—(would not *millstone* have been better?)—and yet, full as it is of weakness and folly, the "eminents" have *extolled* it, and the "North-Western" evidently revels in the teaching of it!

"What is it" that permits, nay, encourages this "state of things"?

Is it that the matter is of no importance?

Is it that "Amalgam," so thoroughly, so wonderfully, so magnificently, so exhaustively, so *scientifically* treated is yet unworthy of any further notice?

Is the old turned-down formula of a dozen years ago (see DENTAL COSMOS, December, 1896, page 991) of silver 68.5, tin 25.5, gold 5, zinc 1, to be received as the "Ideal" amalgam alloy?

If so, how about the "Fellowship," "THE ONLY PERFECT ALLOY" —silver 67.73, tin 26.33, copper 4.71, zinc 1.23, gold *none?*

"What is it" that *permits* such trash as this to be flaunted in the face of *dentistry?*

Surely there's "*something* rotten in the state of Denmark."

"What is it?" *I ask* these questions. *Who* will answer?

# ALUMINUM CROWNS.

BY A. E. PRESTON, D.D.S., DELEVAN, N. Y.

(Read before the Eighth District Dental Society, Buffalo, N. Y., April 26, 1898.)

THE subject of aluminum crowns is one that I have never heard discussed at a dental society meeting, and perhaps to most of you it is not of enough importance to give it much of your time and attention. But for me aluminum crowns, or, more properly speaking, aluminum caps, have been creating quite an amount of interest of late.

I presume that the first thought of many dentists has been, when they first saw the aluminum cap, "What particular advantage have they? If a cap is required, why not use a gold one?" The same attitude was manifested not many years ago in regard to the use of amalgam, but now amalgam holds a high place in our practice. A great many dentists honestly believed that if a tooth was to be filled, it must be filled with gold and gold only. Now we realize that, "in proportion as a tooth needs saving, gold is the very worst material to use."

Then, again, we dentists of the country have a great many patients who are not able to pay for having a quarter of an ounce of gold put into a molar, and yet we save these teeth very nicely and at small expense with plastic fillings. These same arguments will apply as well to the aluminum cap.

When I first saw a few aluminum caps at a dental meeting in this same place, about three years ago, I thought, "Well, they will never amount to much." Nevertheless, I purchased two with the intention of experimenting with them, and it is the results of these experiments that I wish to give you.

A few weeks after making my first investment in aluminum caps a gentleman presented himself in my office with a number of decayed teeth, which he wished me to save if possible. One, a lower second molar, was in very bad shape for holding fillings, and I suggested to him that it would be a good tooth to crown with a gold cap. But the idea of placing so much money into one tooth I saw at once was not congenial to his ideas. Here, thought I, is a chance to try one of those new crowns, so I brought forward one of my aluminum caps, and, setting a figure upon it which I thought he would be willing to stand, I told him that I here had something which would be just what he wanted.

After a few questions concerning the metal, its color, keeping qualities, durability, etc., he consented that I should put it in place. I at once proceeded exactly as I would with a gold cap, and found that this material was even more easily manipulated than a gold cap, on account of the pliability of the metal.

After shaping and fitting the cap and tooth to each other, I allowed the patient to bite, at first gently, then afterward more firmly, until the bite was closed, thus doing nearly all the swaging of the cusps and intervening depressions himself by the act of occlusion.

These caps, you remember, are swaged in the first place, and are of nearly uniform thickness in every part, the same as swaged gold caps, and do not have built-up or filled-in cusps, as our home-made crowns usually do. Hence the ease with which the occlusion is made without the use of impressions, bites, or articulators; in fact, the whole operation occupied but a little more time than it takes to make a good amalgam filling.

This was nearly three years ago; since then I have seen the tooth several times, the last time being the first week of this present month. Everything was in good condition; the occlusion perfect, the color the same as when new, and the patient expressed the same praise for the work you so often hear of a well-fitting gold cap: "Doctor, that is the best tooth in my mouth."

Case No. 2 was not so fortunate in its results. The patient, a young lady, presented a lower third molar, which had been filled and refilled, and was then broken down nearly to the gum-margin. She thought the best thing for the tooth was extraction. But I suggested placing an aluminum cap, which would be much less expensive than gold, and seeing what the result would be. So that course was pursued. In this case I had to build up nearly all of the crown, which I did by undercutting the remaining dentin and filling the cap with cement and then pressing it to place, after having secured a good fit and articulation. The pulp was alive, and responded for a few moments to the action of the cement, as a healthy pulp nearly always does. This crown did good service for nearly a year, when a small break occurred in the margin of the grinding-surface, caused by biting too forcibly upon a hard kernel of pop-corn. The break seemed trivial and very easy to mend, but now comes the part which shows what ignorance and thoughtlessness, combined with a desire to experiment, will sometimes do. I enlarged the opening with an engine bur, made a nice undercut in the cement underneath, and filled the cavity with amalgam; then dismissed my patient, telling her that the crown was now as good as new.

In the afternoon she returned bearing in her hand a crumpled, rotten, distorted piece of metal, which had no resemblance to my handsome aluminum cap; but such it nevertheless was. This was her story: After eating dinner she sat down to talk with her husband, and remarked that that crown seemed loose. She placed her fingers in her mouth and, saying, "It is loose," removed it in her hand and immediately dropped it, exclaiming, "Oh, it's hot! It burned me." "What are you giving us?" remarked her husband, at the same time picking the cap from the carpet. He also dropped it, saying, "Gee whiz! it *is* hot. It's a wonder it didn't burn your mouth." That's just what I said also when she told me the story.

Now, one thing I want to know is, why didn't it burn her mouth? Were the fluids of the mouth keeping it cool, or was it waiting for a contact with the atmosphere to start up the heat-action? I learned one thing that I ought to have known before; that is, that mercury will unite with aluminum just as it will with silver or gold, and that amalgam should not be used to patch aluminum caps.

I don't suppose any other dentist ever makes any of these little blunders, and that is why so few of them are ever brought to our attention. We prefer to tell of some of the brilliant successes we have had with some new appliance, or some intricate operation performed that has brought us fame and our names into prominence. Nevertheless, the little things of daily office practice, when remembered, help to make our work more successful.

I replaced the destroyed aluminum cap by another of the same material, upon the good, solid cement crown, which was well preserved, and it is doing good service to-day.

My experience with aluminum caps has been very limited, but they have proved to be successful when rightly placed. I would not use them when I could use gold just as well, yet I believe they are worthy of a place in crown-work.

## DOUBLE RESECTION OF THE INFERIOR MAXILLA FOR PROTRUDING LOWER JAW.

BY JAMES W. WHIPPLE, D.D.S., ST. LOUIS, MO.

MR. W. G. K., a very intelligent young gentleman of German parentage, first came to me for dental services in October, 1891, being at that time about eighteen years of age.

His lower teeth at that time just overlapped the upper. This had evidently been the condition from the time of their eruption, which is clearly proven by the distinctly defined facets worn upon the outer tips of the upper incisors, which are still plainly visible, as the models illustrated in this article will show.

Otherwise, the lower teeth occupied their proper positions. I saw the gentleman afterward in 1893, 1894, and 1895, but can recall to mind no noticeable change.

In December, 1896, Mr. K. again called on me, when I discovered that a very remarkable change had taken place in the conformation of his lower jaw and teeth.

This condition is clearly shown in illustration No. 1. There had apparently been an abnormal growth of the body of the maxilla, forming a short shaft, so to speak, between the first and second bicuspids on the left side and between the first molar and second bicuspid on the right side, the space separating these teeth being respectively one-fourth and one-eighth of an inch, causing an elongation of the jaw horizontally, which projected the lower teeth about one-fourth of an inch beyond and in front of the upper ones.

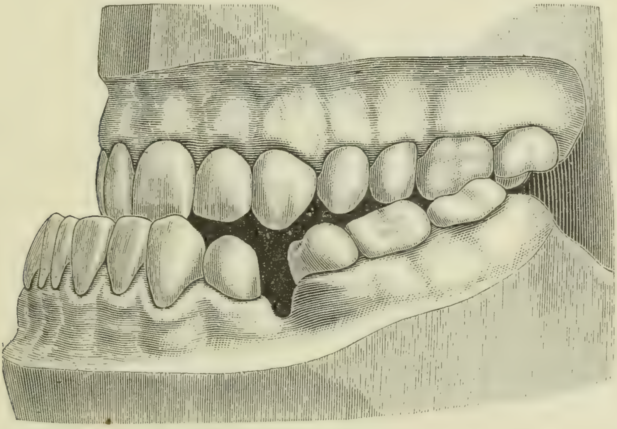
The growth having been greater on the left side, the teeth were also slightly deflected to the right. The occlusion was destroyed, only the distal cusps of the second molars articulating. Mastication, properly speaking, was impossible, and articulation—vocal—greatly impaired. The chin was sharply projected and appeared small and pointed.

I advised Mr. K. to consult Dr. E. H. Angle, of this city, who first suggested the advisability of resorting to double resection in this case.

For some reason, after several interviews and some correspondence between Dr. Angle and Mrs. K., the matter was dismissed from further consideration.

A year having elapsed, I advised Mr. K., who had now matriculated as a student in the St. Louis Medical College, to consult the surgical staff of the college with regard to the propriety of having an operation performed, suggesting to him that perhaps it might be done as a clinic, and by engaging the services of the clinical staff of the Missouri Dental College, which is connected with the St. Louis Medical College, the operation could be accomplished in a comparatively inexpensive way. Mr. K. agreed to do this with the proviso that I should remain in the case and exercise a general supervision of the entire series of operations. He now consulted Dr. V. P. Blair, chief of the surgical clinic, and Professor Paul Tupper, of the St. Louis College, and also surgeon-in-chief of the Baptist Sanitarium.

FIG. I.



He reported to me that these gentlemen favored an operation.

Appreciating the disastrous consequences that a failure would bring upon my friend, I urged additional advice. Dr. E. H. Gregory was then consulted. He pronounced the operation feasible, but did not absolutely advise it.

After a long discussion of the question in all its bearings with Mr. K., I decided upon an operation, and directed him to arrange the matter with the surgeons.

On December 19 the operation was performed at the Baptist Sanitarium. There were present Professor Tupper, Drs. Blair, Miller, Pitman, and Whipple, and several trained nurses. Dr. V. P. Blair was operator-in-chief.

An incision was made about one-half inch long along the base of and just interior to the inferior border of the maxilla. A cross incision was made, of the same length, about on a line with the mental foramen. The center of these incisions was interior, upon the borders of the neck. The muscles and other integuments were now detached from the jaw-bone. Dr. Blair had devised, or had constructed, a double bone saw, consisting of two saws four inches long, attached to the sides of a single handle, and so adjusted as to make a cut, in the clear, just as wide as the space between the two bicuspids on the left side. The sawing was done through the incision from and through the internal surface of the bone from the superior border down to the base. No vessels were ligated, as the hemorrhage was not profuse after the vessels emptied themselves. The bone was cut almost, but not quite through. No attention was given to the contents of the inferior dental canal.

A small hole was now drilled through the bone on each side of the cut near the inferior border for the reception of a wire ligature. The right second bicuspid having been previously extracted, the operation as just described was repeated on the right side.

After the holes were drilled, the remainder of the sawing was done on both sides, and the two small sections of the jaw removed.

Soft copper wire ligatures were now passed through the holes from the external surface. These were crossed on the internal surface, grasped with a pair of pliers, and twisted until the several parts were drawn together at the inferior border, forming an apparently close and smooth abutment of the opposing ends.

At this point the writer withdrew from the operating room, and did not see the patient for several weeks.

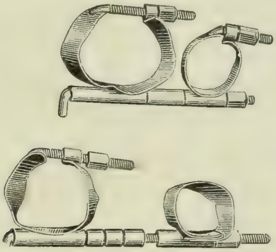
At the end of the third week Dr. Blair brought Mr. K. to my office, when, to my regret, I found a very serious and unfortunate condition of affairs existing. The means adopted for holding the superior borders of the dissevered maxilla in position had proven to be entirely ineffective. The parts had failed to unite on either side. On the left side there was an effusion of bloody pus, which oozed into the mouth when the parts were pressed together. The right side was in a better condition, but no union of the bone had been effected. The jaw was stiff and sore, and the teeth could be separated from the upper only a short distance.

An Angle molar band with tube was adjusted to the first molar on the right side. A bicuspid band without tube was placed on the first bicuspid. Great difficulty was experienced in tightening the nuts on the lingual aspect of the teeth. The tube on the molar band proved to be in the proper position. The end of a traction bar was inserted into this tube, and extended forward across the bicuspid band. A line was marked on this band, showing the proper angle at which the tube should be attached to be in a continuous line with the one on the molar band. Both bands were removed. The tube was soldered to the bicuspid band; the traction bar was passed through both tubes, and the nut screwed on. The appliance as now completed was placed in position. When traction was applied the copper wire ligature at the base of the jaw, not having been twisted tight enough, or being too soft, yielded to the force applied, and the parts were forced apart an eighth of an inch at that point. The appliance was taken off, the traction bar removed, and a piece of tubing put on the bar between the two tubes just long enough to allow them to come together close enough to hold the parts in apposition, both at the superior and inferior borders. The appliance was now replaced on the teeth, traction applied, and the parts drawn firmly together.

A molar band was now adjusted to the left first molar, the tube having been removed and resoldered at the bottom of the band, and at an angle pointing forward and upward to the tip of the lower cuspid, it being feared that the first bicuspid was too near the cut to give sufficient support.

A band was now made from a strip of German silver to fit the cuspid, reaching slightly above the cutting-edge. A tube was soldered to this on a line with the one on the molar. The traction bar was placed in the tubes and the appliance adjusted to the teeth. When traction was applied it was found that the mesial contour or "knuckle" of the second bicuspid, which was in the rear fragment, rested just against and under the distal contour or "knuckle" of the first bicuspid, which was a part of the middle fragment, and was forced down the inclined plane thus formed, until, owing to the copper wire ligature yielding on this side also, the rear fragment was forced a sixteenth of an inch or more below the middle part. This had been foreseen and had been guarded against by the angle given the traction bar from the base of the molar to the top of the cuspid giving an upward and forward pull. The traction appliances are shown at Fig. 2.

FIG. 2.



Bicuspid fracture bands were now adjusted to the first upper bicuspid and to the second lower bicuspid. A figure 8 ligature of brass wire was adjusted on the little knobs on these bands, and the rear fragment was firmly ligated to the upper jaw.

The appliance had been again placed in position. Traction was now applied and these parts drawn close together.

The two jaws were now in juxtaposition just as they are shown in illustration No. 3, the upper cuspid resting on top of the band on the lower cuspid holding it in position, and in which position all the various parts were held absolutely without change for five weeks. The patient lived on liquid food and suffered no great inconvenience physically. Three and a half days were consumed in securing these results, every step being carefully made, as another failure would be most deplorable.

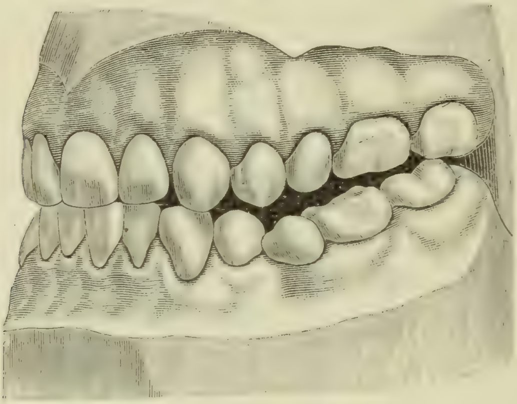
A four-tailed plaster bandage was adjusted, and retained without change for four weeks.

Dr. Blair dressed the drainage wounds at the point of incision every other day, and kept them open with drainage gauze. Borolyptol was used as a mouth-wash. At the end of the fifth week the figure 8 wire ligature was removed.

Dr. Blair reported to me that soon after the removal of this ligature the posterior fragment had dropped down again; that the left side was still without union, while that upon the right was quite weak.

With a heavy heart,—and it was not the only time my heart was burdened during all these weary weeks,—preparations were quickly made to begin again at the beginning; cut to fresh, healthy bone on every end, and make a final attempt to bring about a union of the parts. The patient was once more chloroformed and taken to the operating room, but to our surprise and delight a rigid examination developed the fact that strong osseous union had been secured on both sides.

FIG. 3.

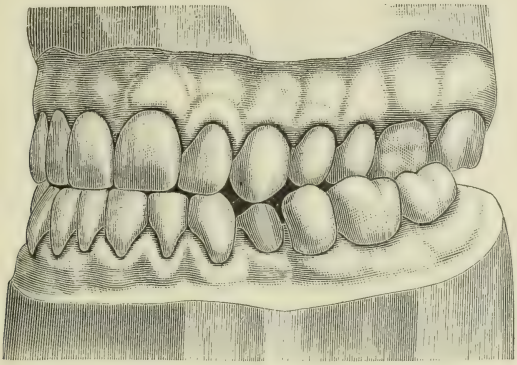


The plaster bandage was again applied and allowed to remain two weeks. During the eighth week I removed the appliance from the left side, and a week later took away the one on the right. The copper wire ligature was removed from the right side, the other having come away previously, while the wound was being dressed. The chin had become somewhat infected and infiltrated with pus, owing to long bandaging, and an abscess was discharged on either side.

Considerable pain and soreness was felt, which delayed the final operation of correcting the occlusion of the teeth by crowning. On April 26 I began that work, adjusting gold cap crowns to the four molars and right bicuspid. A dummy crown was adjusted to the top of the left second bicuspid and soldered to the crown designed for the first molar. The two were then cemented into position. The final result is shown in Fig. 4.

The occlusion is good, and so arranged as to hold the lower jaw permanently in its present position. The left central and lateral incisors are overlapped by the upper teeth. The other incisors were forced slightly out of line during the operation, but will be brought back to their proper position in course of time. There is an entire loss of sensation in the lower lip, caused by cutting the sensory parts of the inferior dental nerve.

FIG. 4.



This causes no inconvenience to Mr. K., who regards it as a matter of inconsiderable importance. It is also hoped that this feature of the case will slowly pass away. The pulps of the teeth in the middle part of the jaw do not seem to have been affected at all.

The gentleman's appearance is greatly improved. No one would suspect that such an operation had been performed.

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# CORRESPONDENCE.

## NATIONAL DENTAL ASSOCIATION, SOUTHERN BRANCH.

TO THE EDITOR OF THE DENTAL COSMOS:

*Sir*,—Kindly insert the following in your columns, for, judging from the letters received, it is evident that there should be a wider diffusion of information in the South regarding the National Dental Association and its branches. In many of the states the law does not require a diploma as a prerequisite for license; these state societies which admit to membership all licensed practitioners, *regardless* of *diploma*, should therefore bear in mind that only their graduate members are entitled to election as delegates to the National Association and its branches. It should be made very clear that, according to the constitution, these bodies accept as *new* members only *delegates* elected by ballot at a regular meeting of the *state societies*, and also that delegates must be *graduates* in dentistry or have acquired the degree of M.D., or have entered the profession prior to September, 1875. The American and the Southern Dental Associations did also, it is true, require graduation as a prerequisite for membership, but as they did not restrict their eligible applicants for membership to *elected delegates* from *state societies*, this feature should therefore be emphasized. The requirements for membership in a branch of the National must necessarily be the same as in the National itself, as membership in the former confers membership in the latter. The above applies both to qualifications and to dues, which are five dollars in either case, but it should be borne in mind that if the dues are paid directly to the National treasurer this does not pay dues in the branch, but the payment of five dollars to the treasurer of the branch cancels all financial obligations to the National treasury for the ensuing meeting, because the branch forwards to the National treasurer three-fifths of the dues received. Payment of dues to the branch therefore insures for *a single fee double membership*, with all the rights, privileges, and benefits of *both* bodies, including the joint volume of Transactions.

By request of the president of the Southern Branch,

C. L. ALEXANDER,
*Cor. Sec'y. Southern Branch National Dental Association.*
CHARLOTTE, N. C., May 28, 1898.

## DENTISTS IN THE ARMY AND NAVY.

TO THE EDITOR OF THE DENTAL COSMOS:

*Sir*,—Congress is now discussing the subject of dental surgery in the United States army and navy. Let all the dentists interested in this movement bring their influence to bear on the representatives from their districts, now in Washington, to the success of this question. This should be done at once, for all who have given this subject careful thought know what a blessing dental surgery would be to the enlisted men.

CHAS. C. STANLEY, D.D.S.
COLUMBIA, S. C., June 20, 1898.

# PROCEEDINGS OF SOCIETIES.

## NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, March 15, 1898, at the New York Academy of Medicine, No. 17 West Forty-third street; the president, Dr. S. G. Perry, occupied the chair.

### REPORT OF THE CLINIC COMMITTEE.

Dr. J. F. P. HODSON. We had a very delightful clinic this afternoon. Dr. Harlan led with the diagnosis of and an operation in pyorrhea alveolaris, and, as often happens with the best clinics, it resulted quite as profitably in a side discussion as in the actual work of the clinician himself.

Dr. Palmer demonstrated filling of root-canals by means of electrical heat and metal points and Balsamo del Deserto. He has made some improvements upon the method, and it is a very practical work which interested everybody.

Dr. Elliott exhibited a number of ingenious helps to operating,—a very practical pneumatic mallet; a method by which control of cataphoresis is placed entirely in the patient's hands; and a very interesting all-round heater, which by means of one little Bunsen burner, continually alight, keeps water for syringing cavities at an even temperature, the top of the syringe warm also, heats gutta-percha on a slab, etc.

Dr. A. W. HARLAN, cf Chicago. As I did not hear all of Dr. Hodson's remarks, I do not know how much of the clinic he described. The first case presented to me was not a case of pyorrhea alveolaris at all,—at least I did not think so,—and so I did not treat it. In the second case there was a small pocket at the side of the bicuspid tooth, and the operation consisted in removing the slight deposits and syringing the pocket with a five per cent. solution of trichloracetic acid. Probably with two or three additional treatments of the same nature this case will recover. I illustrated the application of silver wire, composed of ninety-five parts of pure silver and five parts of gold, for holding the teeth in position. This was in the mouth of a gentleman who had nothing the matter with him; it was simply to show the method of twisting the wire around the teeth in the figure 8, and turning the cut ends in so that in brushing the teeth or using silks or ligatures it would not become displaced. The object in using this is twofold, one to hold the teeth in position and the other for the therapeutic effect. It has been repeatedly demonstrated that the fixing of pure silver or nearly pure silver around the necks of the teeth in close proximity to the gum acts as a destroyer of the pathogenic bacteria such as we find in the mouth, especially the pus-producing bacteria.

Dr. DELOS PALMER. I do not know that I can say any more than Dr. Hodson mentioned, except as to the treatment of the roots of the teeth, preparatory to filling them, which was done with metal pins surrounded with cotton or asbestos, and any medicine you wish to put on, inserted into the tooth, and allowing that to remain as a substitute for a cotton dressing. If you want to use heat with the medicine you add asbestos to the heating point, and put the medicine on that, insert it in the root, heat it, and keep that up until the tooth is in a condition to fill; then put in your balsam, wax, or anything you like; put the heat in with this point, insert a pin with asbestos or cotton, remove it, and you can do the work. The heating is done with White's machine, which carries about four volts, and with the transmitter you can turn the heat on and get any degree you want. The dressing of the roots with these pins is something I have added recently. They are easily removed and easily put in; you can put them where you could not put cotton.

Dr. HARLAN. Before reading my paper, I would like to pass around a set of instruments I have devised for the removal of deposits on the roots of teeth. The instruments are twelve in number, and are arranged in their regular order in a case. They are a little different from the usual forms that have been advertised in the journals.

The only object I have in presenting this paper is to keep awake the interest in this subject. It needs a great deal more light thrown upon it than we have had in the past. We have not arrived at that stage of perfection and the understanding of the causes of this hydra-headed monster as we have in the making of fillings with gold, for instance, and I think the only way to diffuse knowledge of the subject is to keep hammering at it. The program said "with statistics from the practice of the author," but the paper says "with some notes from the practice of the author." Statistics are misleading. I might tell you in the body of this paper that in the past twenty years I have treated so many cases, and their results were so and so, and it would be necessary to elaborate each case; it would take hours and days and weeks to present a written record of all the cases that any one man is likely to treat.

Dr. Harlan then read his paper, entitled "Pyorrhea Alveolaris, with some Notes from the Author's Practice."*

*Discussion.*

Dr. O. E. HILL. I was quite surprised that in Dr. Harlan's treatment, particularly in cases of necrosed bone, he did not mention the use of sulfuric acid in its various forms. For at least twenty-five years I have treated this trouble almost exclusively with sulfuric acid in its various strengths; not the aromatic, for I do not like its tendency to produce a sediment, nor the different properties due to the spices used. Sulfuric acid and the wine of opium are my chief reliances. I use sulfuric acid up to fifty per cent., and I have no hesitancy in putting that in the pockets, according to circumstances. In some cases it will destroy the soft tissue, and if it does I wait a little longer—from three to six days—before another treatment. I am very successful in mild cases. I had a case today which was very singular, and I would like to have Professor Harlan notice this: A child of about nine years, ordinarily healthy, and of a very nice family. To my astonishment, there was an extensive deposit on that child's teeth, the gums loose, and pus discharging. I never saw such a thing before in a child so young.

Dr. M. L. RHEIN. You will find very likely she has nephritis.

Dr. WM. JARVIE. I wanted to hear others speak on this subject before I did, because, judging from what I saw and heard at the clinic this afternoon, there are some who look upon the possibility of curing this disease in certain conditions very differently from what I do. They certainly can accomplish things that I cannot, and I would like to hear from them, as what they would say would be of more interest and benefit to the society than anything I could say. However, I do want to express my interest in the subject that is before us and the manner in which the essayist has treated it. It has been put to us so very plainly that "he who runs may read." The course of treatment advised is apparently very simple; the rules are few, but the application of them, I imagine, is very difficult. The rule that is seemingly the simplest of all is to remove all the deposits, yet that is the most difficult thing to do. How many of us can do it thoroughly, and, if we do not, how many cases can we cure? That is absolutely necessary to successfully treat pyorrhea alveolaris,—to remove *all* the deposit, either with such instruments as have been shown or by chemical agents, such as trichloracetic acid. The calcareous deposits must be removed, otherwise all your after-treatment by medication will not effect a cure, although it will ameliorate the condition. My treatment of these cases has been very similar to that laid down by the essayist. I cannot always remove all of the deposits, and in such cases I fail to make a perfect cure. Almost all incurable cases of pyorrhea, except those that are just ready for the forceps or the fingers, can be ameliorated, and the teeth can be kept passably comfortable for some time,—from one to five years; but eventually they are lost. Where the tartar or the calcareous deposit is removed and proper treatment given to the gums, an absolute cure can be effected.

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*For the paper in full, see page 543 of the current number.

In the paper, or in conversation, Professor Harlan spoke of the commencement of this disease,—its cause. I believe he assumes that in almost all cases the disease commences at the gingival margin; that few, if any, cases commence with a deposit away from the margin of the gum. He says a pocket or place of deposit may be brought about by various causes,—the unfortunate loss of a tooth, so that the adjoining tooth has tipped over and a slight pocket formed in that manner, or by allowing tartar to remain,—anything, in fact, that may wound, bruise, or otherwise injure the gum. I believe a large majority of our cases are brought about in that way, the tartar forming on the roots until it reaches almost the extreme end. This is, to me, the most interesting subject in dentistry, because it treats of a class of cases that baffles me more than any other. Decay of the crowns we can treat, and in the great majority of cases we can restore, either by filling with one material or another, or by artificial crowns; but these cases often baffle our best skill and our most earnest efforts. Unfortunately, too, they occur more frequently where the structure of the teeth is the finest, the most dense, and the teeth most free from decay, and it makes it more trying for us to see such teeth lost from the mouths of our patients.

Dr. John I. Hart. Has Professor Harlan had much success in saving teeth where the phagedenic process has caused a resorption of the roots, where the apex has disappeared, leaving such sharpened edges that in the ordinary occlusion it is a constant source of irritation, particularly in the multi-rooted teeth?

Dr. Wm. Carr. I have been very successful in the treatment of pyorrhea alveolaris. In cases where other gentlemen have failed, I extract.

Dr. Rhein. I was particularly pleased when the essayist spoke of the necessity of forcing this subject upon our attention, the necessity of a propaganda being preached to the profession as to our lack of conscientious duty toward our patients in regard to this subject. Nothing could substantiate his statement more than some of the remarks of the gentlemen present. The truth of the matter is that this is not only a hopeless and thankless duty in many instances, but often one for which we find we do not receive proper remuneration; and, as a result, many of us too often shirk our duty. It is a very easy expedient to advise the removal of a tooth, and thus evade a responsibility which we owe to the patient when he places himself under our care. I do not want you to think that I always make an effort to save every tooth that I see afflicted with this trouble, but if it is the proper thing to do, I do it at all hazards. There is no question in my mind, and I am sure Dr. Harlan has the same opinion, that the people at large would receive much better services in the treatment of this trouble if the profession were willing to grant them. The profession has been unwilling in the past to give its best attention to the treatment of this affliction, for some of the reasons I have specified. It seems to be necessary to preach a propaganda of this kind, and I trust there will be enough men like Dr. Harlan to keep it up until we will be ashamed of ourselves if we pursue the course we have been following in the past.

The only objection I find to Dr. Harlan's paper, and it is an objection that must always be raised to a paper with such a general title as this, is that it has been absolutely impossible for him to cover the subject. I agree with him heartily in regard to the treatment of the simple cases of which he speaks. I am in favor of the treatment of washing out pockets with a solution of mercury bichlorid in hydrogen peroxid. I have been using that for over twelve years. I do not see any necessity of the addition of tartaric acid for the purpose which he mentioned. I recognize the tendency of the sublimate to deposit, but in an ordinary preparation of Marchand's hydrogen peroxid there is sufficient free acid present to avoid this difficulty. This trouble would be met with if we used a preparation like pyrozone, but I have found no such result in using the ordinary peroxid preparation. I believe in the efficacy of this solution. I believe in the syringing with trichloracetic acid in the cases of which he speaks, and I also indorse the silver wire, although I can see no advantage in alloying it with gold. I can see, however, a very desirable benefit in having it absolutely pure. I brought a little piece of pure silver wire to-day, similar to the one with which the patient's centrals were ligated, to show you to what a very fine gauge pure silver can be rolled. I will pass it around, because I would like to have it compared with the wire Dr. Harlan showed this afternoon. While discussing the therapeutic question of pure silver, I will say I have had very good results from the electrolytic effect of pure silver, using the ordinary cataphoric apparatus and a spatula of pure silver, thus obtaining the oxychlorid of silver. I think this is a therapeutic field worth investigating. I want also to emphasize strongly the necessity of the constant and uninterrupted hygiene necessary in all these cases. When we speak of "curing" a condition of pyorrhea alveolaris, it is a word that must be used with proper significance. No one who pays much attention to the cure of any disease supposes, when he says a case of pyorrhea has been "cured," that his patient is left with a condition of the mouth such as if there had never been any pathogenic germs there. When you say you have "cured" that patient, you mean you have done your best to put the teeth in such a condition that they are free from any pathogenic condition at the time. Their continued usefulness depends of course upon the condition in which you have put them. If the immobility of the tooth is necessary, on account of its lack of stability in the alveolar socket, then it involves mechanical questions which each case must solve for itself. If there is sufficient stability present in the root of a tooth, then the cure of such a tooth means you have brought about a physiological condition corresponding to the loss of tissue that has taken place. We cannot restore the lost alveolar plates, and we cannot restore the lost pericementum, but we can keep such a mouth immune from another attack of the disease, if the patient's general health remains up to the normal standard; but if that patient should become attacked by some other disease, which would lower the vitality, we might get a return of the attack which would be akin to the original one.

In the case of the child spoken of by Dr. Hill, I would say that it is not an uncommon thing to find pyorrhea alveolaris in a very young child, because very young children are prone to nephritic troubles. The presence of albumin in the urine of young children is very common. It is a disease which is easily cured. If Dr. Hill will consult the family physician of this child he will find more or less albumin in the urine, if the disease is present. Pyorrhea in children is more common than our literature would show us. The case that was presented at the clinic this afternoon was brought by me with the object of showing the most severe type of this disease that we meet, where operative measures are futile, unless we have some assurance that the general condition of the patient can be brought to a proper tone. The patient is a young man about thirty years of age, a lawyer, who has suffered from neurasthenia in a marked degree, and is extremely anemic, the blood being in a very low-toned condition. I saw him for the first time last September, and at that time the upper right central incisor was the tooth that showed the most marked symptoms of pyorrhea. It was denuded of its gum about half an inch beyond the gingival border. There were a number of other teeth in different parts of the mouth that were also involved. Pressure around the gingival borders produced a copious exudation of pus. The teeth were upper bicuspids and molars, and some of the lower bicuspids and molars. He gave a history of this trouble dating back to 1888. In these cases the trouble comes generally from a lack of nutrition. It is pure starvation of the pericemental tissues that causes such conditions as we find. I would diagnose the case that I presented to-day as a case of anemic pyorrhea. I at once removed the pulp from that central; I found it putrescent, and after filling the root and having Professor Morton take an X ray picture of it, I found the upper end of the root absorbed. I brought with me this evening the pictures which Professor Morton took, one of the upper central, which showed markedly the condition of the resorption of the upper end of the root which had taken place before I removed the pulp. I took the pulp out of one of the upper molars and found it putrescent. I found the upper right third molar had no occluding tooth, and, while it was not decayed and had no abrasion, I extracted this tooth, and on cutting it open found it in a most putrescent condition. On examining the picture I got from Professor Morton, I found there was absorption or resorption of the roots of the second bicuspid, and as I was about to go on with the removal of the pulps of these teeth the patient took an attack of the grip, which terminated in an attack of acute articular rheumatism, and he has been in bed seven or eight weeks. I saw him yesterday for the first time since then, and his mouth had become much worse, as we would naturally expect. It is absolutely useless to do much except take the dead pulps out of those teeth. If that man's general condition can be brought up to par, if his anemia can be cured, all those teeth can be cured. His lower teeth are unstable and wiggle around, and have little of the alveolar plate left. It is necessary to adopt mechanical means in this case to save those teeth, and they should be saved for the proper mastication of food. That is an important point. The patient must have his teeth in order to facilitate assimilation of the food. Artificial substitutes are incapable of performing the function that the poorest teeth perform. Every means should be used for the splinting of such loosened teeth after the pulps are out. I do not care how little stability is left in the end of the root, I would prefer that tooth saved by a splint anchored in the occlusal surfaces of the adjoining teeth to any artificial substitute that can be placed there.

It is impossible for me to say all I would like to on this subject, but before closing I want to emphasize the fact that the profession owe this duty to themselves, that they should not continue to ruthlessly sacrifice teeth because it is an easy way to get out of a difficulty.

Dr. B. C. Nash. I never have cases of pyorrhea alveolaris referred to me. The laity are much more familiar with the name "Riggs's disease." I am one of those dentists who has a mixed kind of practice, and who tries to do his best for all who come into his hands. I feel that I always do my duty in the way of cleaning teeth. This may involve, and it often does, the treatment of pyorrhea alveolaris. The patients would not be any wiser, perhaps, if we gave them a sermon on the subject. I instruct them sufficiently, I think, as to their duty toward themselves, but I do not expect them to make any great improvement in the condition when the disease is an established fact. Beyond cleansing the teeth and, by recognized treatment, putting them in as healthy a condition as I can in two or three sittings, I do not calculate to do more. I do not carry patients through a prolonged treatment of three months or more, with the hope of improving a condition which shall be only temporary at best.

Dr. RHEIN. I do not want the impression to go out that it is my rule that every tooth that presents itself in this condition should be saved. It is often a matter of necessity to remove some of those very bad teeth. When we speak of the teeth we save we are talking of those cases where we believe those teeth should be saved, not of the cases that are doomed to the forceps. People so frequently get that idea, that everything that comes along should be saved, that it is necessary to make the statement that there are plenty of teeth that it is not expedient to save. It is the judgment of the dentist that must dictate whether the tooth should be saved or not; but too often we are derelict in removing teeth that should be saved. When we do attempt to save these teeth, and they are unstable, we must resort to mechanical means. I want to give this warning, that no splint that impinges on the interdental spaces should be used. The ligatures that we saw this afternoon are only temporary expedients, but a splint that is permanent must not impinge on the interdental spaces.

Dr. V. H. JACKSON. I always try to save teeth that are thus affected, by removing the cause and stimulating the tissues to healthy action, supporting them, if need be, with a fixture.

Within the last two months, for different patients, I have removed the palatal roots of two of the upper first molars, they having entirely lost their attachment in the sockets. The buccal roots were sufficiently firm to sustain the crowns and make the teeth serviceable. It was necessary to fill the pulp-canals.

The day before yesterday I removed two lower incisors from the mouth of Mrs. C. I began treatment of these teeth in 1886, after the case had been considered hopeless. In 1890 it was found necessary to retain the teeth with a splint, which held them and made the patient comfortable. In 1891 one of the incisors became entirely detached from the socket, but it was held by the splint until this time. By making proper splints, and taking proper care of the teeth, we can generally help our patients. The matter of expediency, however, steps in, and we must appeal to good judgment in determining the better method to pursue. Some patients are very anxious to preserve their own teeth, and it is the duty of the dentist to find out their wishes and tell them how much trouble they will be put to, and then do the best he can.

Dr. GEO. A. MILLS. There is one aspect of this disease that is hardly mentioned, although Dr. Wassall, of Chicago, has called attention to it. It is the acute condition that takes the form of what I call a pericemental abscess. Those cases do not occur very often, but they entail intense suffering, and the only way to deal with them is to relieve the pain and destroy the pulp afterward.

Dr. L. C. LEROY. I would like to ask Dr. Harlan as to the use of the crystals of trichloracetic acid, which have been advocated by some practitioners. I have within the past few years used it, but I have heard that the crystals of trichloracetic acid, when applied, sometimes give peculiar physiological conditions. Whether that be true or not I cannot say, as I have never seen such.

Dr. H. C. Ferris. I want to ask if any physiological disturbance of any account would result if a mixture of trichloracetic acid in Canada balsam were forced into the pockets?

Dr. Harlan. The questions that have been asked me by various gentlemen I will try to answer.

Dr. Hill wished to know if I had ever seen a case such as he described. I may say I have, and most of such cases are due to stomatitis and are purely local, and usually they get well with purely local treatment. The existence of a constitutional disease at the same time that we have wasting of the gums and deposits on the roots of the teeth is frequently seen, and sometimes the constitutional disease has nothing whatever to do with the mouth, although in some cases it has.

Dr. Hart wished to know what I would do with a case where there was absorption of the root of a tooth, which tooth is sensitive to pressure in mastication. The strong probabilities are that I should extract it, but I might put it off a little further. There are some specimens on the cards that I passed around showing the absorption of roots. It is not an infrequent thing to see after a tooth is extracted that the crowns of one or two teeth have been worn down. Usually the symptoms are so acute that the patient flies to a dentist, who extracts the tooth; they save it and bring it to their own dentist. Just how you can prevent that absorption I do not know. In those cases the absorption has always taken place without any opening from the gingival margin, but absorptions of that kind are not uncommon in other bones of the body.

Dr. Rhein said to use pure silver. The reason I do not use it is because it corrodes too much. I tried some experiments to find out what would be the smallest quantity of gold to prevent the too rapid corrosion.

Dr. Rhein. The ligature has been on this case for two months.

Dr. Harlan. Yes, but three-quarters of the cases you have to treat are not on the central incisors above. Take a molar and a bicuspid, and how long would it stay? It is my judgment that if a wire is made with five parts of gold and ninety-five of silver it will answer the purpose much better. The pure silver has not been as useful in my hands.

The question that Dr. LeRoy and Dr. Ferris asked I cannot answer, because I never tried incorporating trichloracetic acid in Canada balsam. I do not know why you would want a continuous effect of the acid, unless to dissolve some carious bone or some deposit that you had overlooked. With reference to the use of the crystals of trichloracetic acid, I do not use the crystals in a pouch or pocket, because I do not think it requires such vigorous treatment. You do not need full strength to destroy the surface of the tissues. It acts much better if it is twenty or ten or five per cent. than if it is full strength, unless to absolutely destroy some fungous growth or excrescence, or something like that.

Dr. Hill spoke of sulfuric acid. I use it occasionally, but trichloracetic acid will dissolve deposits on the roots of teeth much better, and is much more active. Take a perfectly sound tooth and drop it into fifty per cent. sulfuric acid, and take a perfectly sound tooth and drop it into two per cent. trichloracetic acid, and the two per cent. will eat it up quicker than the fifty per cent. solution.

The general trend of the discussion to-night would be to discourage a man from doing anything in this line. I would like to say that the subject of the treatment of loose teeth and loosening teeth is one that is of much more importance than the invention of a new broach, or a new crown, or a new method of filling the root of a tooth. It is not so very long ago that you were all discussing the question of how to fill the root of a tooth with something besides cotton, and now that you have achieved that object and can fill the root of a tooth with gutta-percha, zinc oxychlorid, paraffin, or metallic points, or something that is a success, you have not conquered all of the problems in dentistry; and because you can contour teeth with gold, and restore them so the interproximal spaces will be filled with what ought to be there, that is not all of dentistry. A man or a woman with twenty-four, twenty-six, or twenty-eight teeth of his own will do much better masticating, in my judgment, than he will with twelve or fourteen of his own and the remainder on a rubber plate, or a gold plate, or a bridge, or anything of the kind. It is not expected, and no one believes, that every man will undertake to treat and restore to a state of health and usefulness a hopelessly loose tooth, where one of the roots is completely denuded of the gum, the pericementum, and the process. We do not do those impossible things. Occasionally we amputate a portion of a root of such a tooth, and cut down a portion of the crown, so it will not have to bear too great a burden for one root. All teeth that have pockets and pouches and deposits on the roots are not loose; many of them simply make the possessors disgusting to the persons with whom they come in contact, because they are exhaling through the mouth such fetid odors that we turn from them when they approach us. Anything that will benefit such a condition is a distinct benefit to humanity, and any one who practices dentistry, who wishes to do the best possible, will so fit and instruct himself and familiarize himself with the conditions, and make his fingers so skillful that he will be able to handle those cases just as carefully and as particularly as the ophthalmologist or any other specialist in medicine treats his cases. Then he will apply that knowledge in the places where it will be remunerative. Because one man can get only fifty cents or a dollar an hour for his time in treating cases of this kind is no reason why I should not get ten or twenty dollars, if I am fitted to do it. Let every man work in the field he chooses, or he is best suited to. I do not care anything about making crowns or bridges, but I take off my hat to the man who can do it beautifully. He and I work together. I do not care to accomplish the whole field of the practice of dental and oral surgery, but if I can render sensitive, loose, and painful teeth comfortable to their possessors, so they can masticate properly, and so they will be benefited in health, I am willing to devote all of the time necessary, and the compensation will take care of itself.

The PRESIDENT. I believe, Dr. Harlan, you are in error in presuming that the general trend is not in favor of your paper. I think those who spoke had in mind those extreme cases which you yourself would not undertake. There is a great deal to be done in saving those teeth, by taking them in hand in time.

Adjournment. W. J. TURNER, M.D., D.D.S.,
*Editor New York Odontological Society.*

## UNION MEETING OF THE MARYLAND STATE DENTAL ASSOCIATION, WASHINGTON CITY DENTAL SOCIETY, AND VIRGINIA STATE DENTAL ASSOCIATION.

THE second union meeting of the above-named societies was held at the Dental Department of the Baltimore Medical College, June 2, 3, and 4, 1898.

### FIRST DAY—*Morning Session.*

The meeting was called to order at ten o'clock by Dr. Wm. A. Mills, of Baltimore, chairman of the joint business committee, and the session was opened by prayer offered by the Rev. Peregrine Wroth, of Baltimore. Dr. Mills then introduced Dr. F. F. Drew, president of the Maryland State Dental Association, who took the chair, and in a neat speech welcomed the visiting societies to Baltimore. Addresses in response were made by Dr. W. N. Cogan, president of the Washington City Dental Society, and J. V. Haller, of Wytheville, Va., president of the Virginia State Dental Association.

Dr. A. W. SWEENY, Washington, D. C., read the following paper:

### DENTAL LAWS AND WHAT THEY HAVE ACCOMPLISHED.

After all that has been said and written upon the subject of dental legislation, it is certainly both proper and reasonable to ask the question: What has it really accomplished, and to what extent is its influence recognizable in the present status of dentistry?

The most ardent supporters of the dental laws do not hesitate to claim that to the influence of those measures must be directly attributed a very great share of the credit for all the advance and improvement to be noted, of late years, in dental educational methods and results; but the representatives of the colleges generally will not admit such claims, and insist that dentistry has simply followed the general tendency toward higher education. Most probably the actual truth of the matter is somewhere between the two extremes. Had there been no laws, the teaching would still have continued to improve, in the better class of colleges at least, since those institutions came into being without any legal stimulus or oversight, but that the existence of such statutes has served to impose some check upon loose methods in the management of dental schools is so probable as to be almost universally conceded. Therefore, to the extent that they have acted as a stimulus to, or imposed some wholesome restraint upon, certain colleges, the dental laws may fairly be said to have accomplished some good results. Have they been of any further benefit? If we may judge from the claims put forward by many of their most ardent advocates, we must conclude that they have accomplished nothing further of value.

Next comes the very proper inquiry, Have they done any harm? To this question, unfortunately, the answer must be that they have. They have most certainly stirred up a vast deal of unrest and ill-feeling in the profession. They have opened the way for the introduction of methods among us which belong more to the realm of politics than to dentistry, and have afforded the opportunity for men utterly lacking in those calm judicial qualities of mind, so essential to all who may be safely intrusted with the management of legal questions, to push themselves into an injurious prominence. Some of their worst features have served as pretexts for the profession of other countries to secure the passage of measures yet more objectionable, under the plea that they are following the example of America's dental legislation. Added to the above, they have signally failed to accomplish that one grand essential feature, which should always be clearly recognizable in all legal enactments, in that they do not fairly disclose themselves as measures designed to foster and promote the general public welfare. It is now some time since the DENTAL COSMOS pointed out, editorially, that most of the efforts in connection with dental legislation had been expended in attempts to devise something to promote the welfare of dentists, as a class, not the entire community; and it is well known that class legislation cannot be popular. The public, therefore, even the most intelligent among them, do not sympathize with the laws, for they do not look upon them as measures from which they may expect much benefit.

In a recent conversation with a gentleman who is deeply interested in the matter, he said, "It is almost impossible to secure a conviction under our laws, for no matter how clear the evidence, the jury can hardly be induced to convict." Certainly that shows that the public interest and sympathy are not with the law; and in the case of *practical* questions the public can generally be counted on to be right.

Having conceded the claim that the dental laws have enforced a somewhat higher degree of attainment among the average of the college graduates of recent years, let us consider what benefit, if any, has been derived by the public at large from such increased attainments. In plain terms, how much better service, on an average, are the public receiving now, as a result of our many years' experience in law-making? Far be it from me to insinuate that dentistry has been standing still, or retrograding. On the contrary, it has made great and brilliant advances, and we can feel justly proud to claim brotherhood with those who have written their names high up in the list of the world's great scientists.

Even apart from the few great geniuses here and there, there has been some improvement of late years which serves to affect the rank and file. For example, the quite extensive adoption of crown- and bridge-work has served to bring about a considerable improvement in prosthetic work generally, and it has also served to enforce more honest and thorough methods in the treatment and filling of root-canals. It is not so common now, though still a condition much too frequently met with, to find devitalized teeth which have been filled without any attention whatever having been given to the root-canals or their contents. But apart from these examples, when we come to consider the every-day service which takes up so much of every practitioner's time, namely, filling teeth, the question may well be asked, has there been any very general and decided improvement? Do the great mass of the patients who daily apply for that service find that it is being rendered in a better manner in these days, when dentists generally are compelled by law to be better educated than formerly? Frankly, I think not. It is even claimed by some that the average operator to-day is not as good a tooth-filler as was his colleague of some years back, on account of the great increase in the use of plastics having caused many to fall short of the necessary degree of dexterity required to use gold in a really skillful and artistic manner. Of course, there are many really splendid operators to-day, probably more of them than ever before, as the total number of dentists is so much greater. But is the average of ability or professional integrity higher; and if so, to what extent is that improvement due to legislative influences? Certain it is, whatever may be the true average of attainment now, the finest gold-working artists among us would hesitate to claim superiority for their greatest masterpieces over the operations of such a man as the late Dr. Marshall H. Webb, for example.

But while our best men, our geniuses and enthusiasts, are continually leading us on, or striving to lead us on, toward greater scientific knowledge and broader, higher attainments; while the rank and file of us are plodding along, falling short in many respects, yet, after all, possibly doing nearly as well as should be expected, what about the rear guard—the stragglers and camp-followers—those who shirk the fight, but are keen to rush in and have a share of the plunder? What of that element in the profession which needs the greatest possible amount of legal supervision, and against which the public stands in the greatest need of protection? Surely that class has flourished and multiplied, and has also grown bolder, more injurious, and more unscrupulous. While the best and highest element in the profession has continued to advance, the lowest element has grown in numbers and descended to lower and more injurious methods; and we have yet to discover that all the laws have served to retard that degeneration one iota. Nowhere in the United States is there any adequate legal restriction placed upon the grossest malpractice. As an illustration, right here in this city a mountebank could not be prevented from extracting teeth by wholesale. Why? Because he was doing it without making any charge, and the same thing was done lately in one of the suburbs by an organized band of mountebanks. How would it have been if some similar aggregation were to have offered to amputate diseased fingers free of charge?

Now, it will not do to dodge the question by saying that people who have no better sense than to patronize such humbugs deserve all they get. We are a recognized profession, and when we apply to our legislatures for laws, it is reasonable to assume that those laws are intended to accomplish something. If, as is usually the case, the plea happens to be "the protection of the public against injurious practices," the public has a right to conclude that after the law goes into effect such practices must cease, and the careless or ignorant will naturally conclude that whatever goes on is all right; while the more intelligent must soon discover that the law leaves them to look out for themselves, while it concerns itself with technicalities among dentists, and consequently when called upon to act as jurors in passing upon the merits of such disputes their natural tendency is most prone to be against the law, which has failed to afford them any visible benefit.

Can this state of things be improved? Most unquestionably it can. The law should be made more practical, more effective as regards benefit to the public, more popular. It cannot say to any man, You shall not do cheap work; you shall not advertise in the newspapers, or on handbills; but it can say, You shall not commit flagrant malpractice, at any price whatever, or free of charge. It can say, You shall not advertise false statements; you shall not advertise the same thing under different names and at different prices, and you shall not offer secret and dangerous preparations as perfectly safe. As especially appropriate here, I beg to refer all interested to the article entitled, "Secret Remedies," by Dr. Ottolengui, in the April number of *Items of Interest.* Legislation founded on such lines would soon win for itself the approval of the intelligent portion of the community, and in due time would be generally respected and appreciated. When, under such a law, the attempt should be made to convict some one, not of an offense which to the mind of the intelligent layman would appear to be merely a technicality, having about it a very strong suggestion of "red tape," but for direct violation of a provision which is obviously designed for no other purpose than to protect the public from fraud and direct injury, there will be little difficulty about finding a jury which will give the desired verdict.

Before closing, it affords me much pleasure to make an acknowledgment which, though long deferred, is now made with all the greater freedom because the long delay has been occasioned solely by ignorance.

On more than one occasion I have taken the opportunity to sharply criticise some of the dental laws of other countries, notably that of England, which recognizes no dental degrees save those granted by her own colleges. Once I was in turn criticised by an eminent member of the profession, who said that he disliked to have "bricks thrown at England," because no country on earth was trying so hard to promote and maintain a high standard in dentistry; but, unfortunately, the gentleman was not more explicit. Since then certain information which I have received compels me to modify my views very decidedly. If correctly informed, I have nothing to retract in regard to the letter of the English law. It simply refuses to recognize any foreign degree, hence, *literally*, it is narrow and not in keeping with the true professional spirit, but I have it from high authority that in their *practice* they are far ahead of us. While they have the legal right to exclude any one from practicing who does not come strictly within the provisions of their laws, I am informed by several gentlemen of unquestioned veracity and ample experience that they have never known of an instance in which the law has been enforced against a foreigner who has shown himself to be an honorable, well-meaning practitioner. It is with the greatest pleasure, therefore, that I now tender this acknowledgment to our colleagues in the mother country, and wish them God-speed in their practical efforts to uphold a high professional standard. All the more are they deserving of praise if, while having a law which admits of a very harsh and narrow construction, those who are charged with its enforcement have a sufficiently high conception of the true spirit of professional ethics, a due regard for the actual public welfare, and so large a measure of sound practical common sense as to carefully refrain from a blind and arbitrary adherence to provisions which could readily be rendered most objectionable; and though I cannot consistently hold up the English law as a model for our American Solons to imitate, literally, I can most heartily recommend that many of those gentlemen who seem so constantly consumed with zeal to "examine" everything in the shape of a dentist daring to venture anywhere in their vicinity, and who seem unable to rest comfortably in their beds at night while haunted with the thought that some man, possibly quite as richly endowed with professional skill and integrity as themselves, may be practicing (very creditably, withal) somewhere within their territory, "without having received a certificate in due form of law," that they adopt a few suggestions from our practical, fair-minded English cousins.

The discussion of Dr. Sweeny's paper was deferred until the following paper had been read, by Dr. W. G. Chase, of Philadelphia:

### The Status of the Degree D.D.S. under the Law.

Mr. President and Fellow Dentists,—In response to your worthy chairman, Dr. Mills, asking me to present a paper at this meeting, I hardly knew what reply to make. After some hesitation I signified my willingness. Then came the difficulty of selecting a subject that would interest you. After studying the matter, I concluded to bring to your attention the subject or question, What is the status of the D.D.S. under the law? In other words, to what extent may the holder of this degree lawfully prescribe medicines for his patients to be taken by the alimentary canal, or in the other usual ways of administering medicine?

In all states there are laws purporting to regulate the practice of dentistry, some more stringent than others. I have yet to find in one where the status of the D.D.S., or what constitutes dental practice, is defined. They all say a person must either have a diploma, or pass an examination before a state board, and in many states, in fact most states, require both a diploma and an examination before a person can practice the profession of a dentist. Some states are more stringent in their requirements than others. It is not necessary for me to name the requirements of the different state boards or colleges, as you are all familiar with them; nor do I think they are more than is necessary to keeping up of the proper standard of our profession.

If you will examine the dental laws of the different states of these United States, you will find in most, if not all, a clause which exempts a physician from offending in the extraction of teeth, etc. On the other hand, examine the laws relating to the practice of medicine; do you find any reference to the dentist? No; or, if you do, you have found more than I have. I have no objection to the M.D. extracting teeth (as far as I am concerned individually he can do it all), but this shows the laws of the two professions are not fully in accord. Nor do I wish to be interpreted as antagonizing the M.D., for I am not, for we often need him, and badly, especially when a certificate of death is necessary; but, fortunately, we as dentists do not often kill our patients.

Notwithstanding that the laws regulating the practice of medicine say that a man must have the degree of M.D. in order to prescribe medicine, and that laws regulating the practice of dental surgery say naught on this subject, I have always advocated and practiced the prescribing of medicine in such cases as I was called upon to treat which, in my judgment, needed medicine internally. I believe I am fully in my rights as a dentist in so doing.

Claiming that the degree of Doctor of Dental Surgery, as conferred by the colleges and universities chartered under the laws of the different states of these United States, gives the holder thereof, when properly approved by the state board wherein the holder intends to or does practice, the right and authority to administer anesthetics, drugs, or remedies for the alleviation of such diseases as come under the dentist's care, I also believe that in case he (the dentist) failed to so prescribe, or saw to it that the remedies needed were prescribed in case he felt himself incompetent (which would be a sad case), he would not be doing his duty.

Mr. Benjamin Alexander, an attorney at law of Philadelphia, in a paper read before the Garretsonian Society of the Philadelphia Dental College, says, "If it be discovered in the treatment of a patient that an internal medicine is necessary to improve the part treated or operated upon, it is obligatory upon the dentist to prescribe. If unable to prescribe, he should immediately recommend the patient to a physician for the purpose of obtaining the necessary remedy. A failure upon his part to attract the patient's attention to his condition would render the dentist liable." I do not believe we as dentists encroach upon the physician's prerogatives.

There are many conditions that it would be inexpedient as well as inconvenient for the dentist to treat that come under his care or notice, in which event it is our duty to refer the case to a physician; but there are diseases that come under the dentist's care that he should treat, mainly from the fact that the M.D. knows little if anything of them or their treatment.

If the dentist's hands were tied through the law not giving him the right to prescribe, he would be forced to do one of two things,—violate the law, or say to the patient, "I know what to give you, but the law will not permit me. I will have to refer you to a physician. I can only fill your teeth, or furnish you substitutes." This is not a pleasant picture, though I have drawn it imperfectly, and I am glad to say I do not believe the law so hems us in.

If dentists had no legal or moral right to prescribe medicine for their patients, dental surgery would cease to be a profession; it would be merely a trade. We would have no need of colleges to teach it, nor examining boards to regulate it. I do not believe it possible for a man to successfully practice the dental profession except he is well grounded in pathology, materia medica, and therapeutics, as well as in the other branches of the profession.

Judge C. G. Garrison, of the New Jersey bar, says a dentist may be defined to be one whose occupation is the care of the teeth when sound, the treatment of their deformities and diseases when unsound, and the adaptation of substitutes for them when lost by age, accident, or disease. He further says that this definition embraces the hygiene, not only of the mouth, but also of the general system, of which the teeth are a sensitive index, and includes operations upon the alveolar process and adjacent bone.

In a case of caries, or necrosis of the jaws, without the knowledge of medicine and the lawful right to prescribe such remedies as the case demanded, the dentist most assuredly would not be able to do his full duty by the patient presenting such a case.

I also call to your attention an opinion given me by William W. Smithers, of Philadelphia, a lawyer of note. "A Doctor of Dental Surgery is neither a physician nor a surgeon, properly so-called. He is a surgeon of a limited character, and his skill must be exercised within the limits of dentistry. It extends to care and treatment of the teeth and the mouth in general. Obviously he can have nothing to do with a fractured leg or a case of indigestion. Independently of any treatment of the mouth or teeth, the dentist can neither perform a surgical operation nor administer medicine. But where the administering of medicine is subservient to the practice of dentistry, it is perfectly lawful. For example, the giving of gas, or the prescribing of a drug to counteract the effect of a diseased or extracted tooth upon the stomach, would be entirely proper. It must rest with the individual practitioner to use his judgment and say under the circumstances of each case whether the administering of the medicine is necessarily incidental to the practice of dentistry."

A different construction is given in England. The province of a dentist embraces the art of treating diseases and lesions of the teeth, and supplying artificial substitutes in the place of these organs when lost. While it is recognized that many causes are systemic, yet the dentist cannot prescribe for the relief of his patient except he is a qualified physician or surgeon. All the dentist can do is to relieve local trouble.

While the subject of a national law is being talked of and hoped for, there should also be a law not only regulating the practice of dentistry, but it should at the same time define in a clear and concise manner of what the practice of dental surgery consists, and what dentists' rights and privileges are. If you remember, when you received your degree, the one upon whom devolved the duty of conferring it addressed you in language similar to this: "By the power in me vested by the charter and commonwealth of (naming state), I do confer upon you and each of you the degree of Doctor of Dental Surgery, and therewith all the rights, privileges, and immunities of this degree."

It was not explained to me, nor do I believe to any of you, just what was meant, but all were left to interpret these words according to their own ideas. I have kept away from the old subject of dentistry being a specialty of medicine, as I do not care to get into an argument on that subject. I believe we as dentists want to go hand in hand with the physician as brothers and equals, and not as inferiors.

I unfortunately know no legal light in this your section, so I cannot give you an opinion from this state or section. The opinions I have given are not based entirely upon local laws of Pennsylvania or New Jersey, but the gentlemen have tried to give a common law opinion, and I think under those opinions a dentist has the legal right to prescribe medicine for his patients for all diseases that come under the dentist's care.

I trust I have in some small degree interested you, and that the day is not far distant when we shall have a universal law governing us over this whole country, and let us ever strive with hopeful spirits and high devotion to our chosen profession to lift it to the highest nobility.

(To be continued.)

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## SEVENTH DISTRICT DENTAL SOCIETY OF NEW YORK.

THE thirtieth annual meeting of the Seventh District Dental Society of the State of New York was held in the Chamber of Commerce, Rochester, April 25 to 27, 1898; Dr. J. W. Cowan, of Geneseo, in the chair.

In his annual address President Cowan praised highly the work of the Dental Protective Association, and spoke of the necessity of the membership of the association being built up. He spoke also of the value of Dr. Black's work in investigating the properties of amalgam, and recommended the reports of this work to the careful consideration of the profession.

After the transaction of routine business, Dr. W. W. SMITH read the following paper:

## A Few Incidents and Their Lessons.

I have at different times been requested to give the facts in a case that came into my hands about a year ago, and which elicited very extended comment through the press. I have granted the request of the chairman of our Business Committee to do this, and without considering the difficulties in the way of making it interesting, consented to write on the above-named subject.

A great deal is being said and written concerning the relation between the professions of medicine and dentistry; to what extent the physician should recognize and consult with the dentist, when either overreaches his domain or encroaches on that of the other, etc. The physician has come to recognize the potent influence of dental lesions as the causation of disease in other organs, and reflex neuroses, the suffering from which is often severe and can only be relieved by dental treatment. In like manner the skill of the dentist is often baffled by conditions of the general system which he may or may not be able to diagnose or treat. In either case a proper understanding between, and a free consultation with, each other is very beneficial to suffering humanity.

A few years since a young man came to me with an abscess discharging through a fistula posterior to the ramus of the lower jaw, with the statement that his physician, after failing to heal it, had decided that it was caused by the second molar tooth, which he ordered extracted. On examination of the tooth I found it somewhat decayed, but the pulp was alive and no indication of an abscess or of its being the cause of irritation. I expressed my opinion to the young man, and told him I should be pleased to consult with his physician. A little later he returned, saying that Dr. ——— would have nothing further to do with the abscess until the tooth had been extracted. I replied that I would *not* extract the tooth. The following day I left for a month's vacation, and on my return this same young man came to me to have the tooth in question filled. The abscess—which had been treated by another physician—was entirely healed.

About three months ago I received a note from one of our physicians requesting me to meet him at the home of one of his patients for consultation. The lady had suffered from facial and frontal neuralgia for four months, and had been confined to her bed most of the time for two months. Her suffering had been excruciating. The doctor told me he had exhausted all neuralgic remedies known to materia medica, and had just resorted to a blister, and all without any relief. On making an examination of her teeth I found a large cement filling in the upper third molar which had been in about four months. I made a very careful examination of this tooth, and the only indication of trouble was that an application of hot water aggravated the neuralgia, indicating a slight congestion of the pulp. On removing the filling the pulp was found to be exposed, to which I applied anodyne remedies, resulting in immediate relief. Two days later the pulp was devitalized with arsenic, and I have since filled the tooth. Nearly three months have elapsed and there has been no recurrence of the neuralgia. She is very profuse in her expressions of gratitude. It is due the attending physician to state that he had been informed by a dentist that her teeth had nothing to do with the neuralgia.

On February 4, 1897, a young lady eighteen years of age filled an appointment with me, at which time I inserted several plastic fillings. There was nothing to indicate any special nervous strain; her teeth did not seem to be of the hypersensitive type; she was, however, of a retiring, undemonstrative disposition, and, I learned afterward, had looked forward to the time of the appointment with great fear. This was her first experience in a dentist's chair.

The following day she returned to fill another appointment. After preparing a crown cavity in a lower molar, which seemed to be quite sensitive, I placed a pellet of amalgam in the cavity, and while reaching for a plugger, noticed a moan, which was followed by a collapse into a state of apparent unconsciousness. I immediately removed the amalgam and her jaws became rigid. Her pulse and respiration being nearly normal, it seemed to be a case of hysteria. I called my assistant, and the patient's mother, who fortunately was in the office at the time. We placed her on a couch, and made several unsuccessful attempts to induce her to swallow some brandy. This was given through an aperture caused by the loss of a bicuspid, her jaws being firmly set, and deglutition seemed impossible.

We then summoned her physician, who pronounced it a case of hysteria, and, advising further efforts to administer brandy, left, having another very important case demanding his immediate attention. Returning in about two hours, just as the trismus was passing off and we had gotten her in a sitting posture, he made a hypodermic injection, and we were able to remove her to the home of her grandmother, near by, she being able to walk.

I directed her to come in the following morning to have the tooth filled temporarily, but instead received a summons to call at the house in consultation with her physician, who had been with her a good portion of the night, her condition during the night having been similar to that of the previous day while at my office, with periods of relaxation, but only semi-consciousness. She being in a stupor, on questioning her and watching her actions and with a vivid memory of the operation on the tooth referred to, we decided that there was probably nerve-pressure; that I had encroached on the tooth-pulp in excavating by indenting a thin portion of the dentin. I accordingly attempted to expose the pulp with excavators, but without success. Sending for my dental engine I with difficulty drilled through, as a thick portion of dentin intervened. Anodyne remedies were applied, but expected relief did not follow, and four days later I extracted the tooth, there being a crowded condition, with a partially erupted third molar. But this did not materially relieve her condition, and it was practically unchanged for nearly three weeks, during which time I saw her every few days, as she had two other teeth with exposed pulps, to which I applied palliative treatment.

During this three weeks the duration of the spasms would vary from ten minutes to two hours, at first occasionally affecting her upper extremities, but usually only her head and neck, which were perfectly rigid, with a countenance resembling a statue. These were sometimes preceded by singing. She would with a slight gasp almost instantly recover from the attack. Her eyes were very much affected; could not endure the light, nor could she open them. During her conscious moments she would complain of severe occipital pain. Her average temperature up to this time had been subnormal.

The family refused to have other counsel called. On consultation with the physician, we decided to extract all teeth that might cause an irritation, as he was unable to find other cause for the trouble or to remedy it. An attempt to extract the teeth caused a trismus which made the operation impossible. Anesthesia by ether was decided upon, and several teeth were extracted. I called the following evening and found she had been free from convulsions, and for the first time during her illness expressed a lively interest in her condition. She was able to open her eyes, and said her headache had disappeared; had been troubled more or less since the operation with nausea.

These conditions continued without much change for about ten or twelve days, she having had only one or two slight convulsions. At this time the physician's attention was called to the fact that there was a marked diminution in her urine, and an analysis showed a superabundance of albumin, the urine solidifying on application of heat. Four days later she died. I had not seen her since the day after the extraction of the teeth.

I wish to mention another important condition. The time of the first attack was the beginning of the menstrual period. Now, the question arises as to what extent the dental operation and dental irritation was responsible for her condition. As the attending physician will not venture an answer, I will only at this time make a suggestion. The insidious nature of some forms of renal disease renders it probable that a uremic condition existed; and the irritation caused by work on her teeth being just at the beginning of the menses, produced sufficient nervous irritation to bring on uremic convulsions.

I am disappointed in not being able to obtain a better history of the case. I had hoped to see the girl's mother and learn if she had had a history of headaches or other symptoms indicating renal disturbance, but she lives out of town, and I have not had an opportunity of seeing her since the death of the young lady. The physician says he discovered nothing in the urine to indicate kidney-trouble till the time above mentioned. He cannot give any history of the case except from memory. Had I used cataphoresis it would have been difficult to have satisfied the laity and perhaps the profession that it was not the cause of the trouble. The mistake on my part was in not keeping in closer touch with the attending physician (which was not his fault), studying up the case with him, and keeping a minute history of the same.

### *Discussion.*

Dr. Chas. T. Howard, of Rochester, thought that a closer watch of the patient by both physician and dentist would perhaps have been of advantage. It was not likely that the presence of albumin in the urine could be charged to the trifling dental operations performed, but the condition was already unfavorable, and the slight disturbance to the nervous system was sufficient to bring on the catastrophe.

Dr. D. H. Waugh, of Rochester, was interested in the paper, partly because he had recently had a case which showed that grave systemic disorder was sometimes caused by dental conditions. The patient was a boy who had been subject to fits for something over three years; his condition was such that it was not considered safe to send him on an errand alone. He was brought to town and placed in the care of a medical friend of Dr. Waugh's for treatment. By the request of the physician, Dr. Waugh made an examination of the boy's mouth, and finding the teeth very much crowded he, by the consent of the mother, extracted four teeth. Several months have passed since, and no fits have occurred.

(To be continued.)

## WASHINGTON STATE DENTAL SOCIETY.

The eleventh annual session of the Washington State Dental Society convened at Tacoma May 16 to 18, inclusive, the meeting place being at the rooms of the Tacoma College of Dental Surgery. An interesting meeting was held, resulting in much good professionally and socially. The meeting was presided over by the president, Dr. R. B. Grutle, of Seattle.

The following officers were elected for the ensuing year: P. H. Carlyon, of Olympia, president; W. E. Burkhart, of Tacoma, first vice-president; J. N. Prather, of Seattle, second vice-president; D. I. Burkhart, of Seattle, secretary; J. E. Banks, of North Yakima, treasurer.

D. I. Burkhart, *Secretary.*

## NORTH CAROLINA STATE DENTAL SOCIETY.

The twenty-fourth annual meeting of the North Carolina State Dental Society was held in Fayetteville, N. C., May 11-13, 1898.

The officers elected for the ensuing year were as follows: C. W. Banner, president; E. P. Keerans, first vice-president; J. J. Battle, second vice-president; D. L. James, treasurer; J. S. Spurgeon, secretary; J. F. Griffith, essayist; V. E. Turner, supervisor of clinics.

Committees were appointed as follows: Executive Committee, Drs. H. V. Horton, D. E. Everitt, J. M. Ayer. Publishing Committee, Drs. I. N. Carr, S. P. Hilliard, C. A. Rominger.

The next meeting will be held in Raleigh, N. C., Wednesday after the first Monday in May, 1899.

J. S. Spurgeon, *Secretary.*

# DENTAL COLLEGE COMMENCEMENTS.

## NEW YORK COLLEGE OF DENTISTRY.

THE thirty-second annual commencement exercises of the New York College of Dentistry were held in Chickering Hall, New York City, on Saturday evening, May 14, 1898.

The address to the graduates was delivered by Rev. J. Lewis Parks, D.D.

The degree of D.D.S. was conferred on the following graduates by Rev. George Alexander, D.D., president of the board of trustees:

William D. Ayers.
Joseph A. Barrett.
Charles Bokay.
Julius M. Bottstein.
Arthur R. Bourne.
Frederick Boylhart.
Thomas F. Clune.
Herbert J. Cornell.
Irving J. Crump.
Wm. St. G. Elliott, Jr.
Moïse Garmidor.
Ray E. Gilman.
Frank F. Goodwin.
Abraham Greenberg.
William H. Gregory.
Charles C. Halgren.
Rudolph F. Hass.
Jacob S. Hyman.
Alton A. Jones.
Ray M. Kaulbach.
James P. Kelly.
John T. Kempton.
Albert Kerr.
Leo Konski.
Harold A. Koonz.
Frederick H. Lum, Jr.
James Maddren.
Thomas J. Mangan.
Charles C. Milligan.
Raphael J. Moolten.
William A. Morris.
Harry G. Nolan.
Bertram R. Perkins.
Thomas H. Pratt.
Joseph I. Protassewitch.
Frank Quackenbush.
Thomas A. Riordan.
Thomas J. Seaman.
Joseph Sookne.
Julius Stern.
William Talbot.
John E. Urich.
Edwin B. Van Saun.
Albert F. Van Winkle.
Thomas F. Walsh.
Reuben H. Whitmyre.
John R. Wyckoff.
Arthur Young.

## DETROIT COLLEGE OF MEDICINE—DEPARTMENT OF DENTAL SURGERY.

THE fifth annual commencement exercises of the Department of Dental Surgery of the Detroit College of Medicine were held in Harmonie Hall, Detroit, Mich., on Thursday evening, June 16, 1898.

The address to the graduates was delivered by T. J. Collins, D.D.S., and the valedictory by C. J. Gray, D.D.S.

The number of matriculates for the session was ninety-seven.

The degree of D.D.S. was conferred on the following graduates by General L. S. Trowbridge:

| NAME. | STATE OR COUNTRY. |
|---|---|
| J. H. Armstrong | Ontario. |
| J. H. Blain | Michigan. |
| W. A. Brown | Ontario. |
| S. Bump | Michigan. |
| C. E. Cochrane | Michigan. |
| L. M. Dickens | Michigan. |
| K. M. Fechheimer | Michigan. |
| D. N. Graham | Ontario. |
| C. J. Gray | England. |
| G. Hackett | Ontario. |
| G. L. Haywood | Michigan. |
| E. Higgins | Michigan. |
| S. Hodgson | Ontario. |
| H. Iler | Ontario. |
| C. M. Leonard | Michigan. |
| D. A. McMillan | Ontario. |
| J. W. McVicar | Ontario. |
| C. C. Messenger | Michigan. |
| W. W. Mitchell | Michigan. |
| D. M. Simpson | Ontario. |
| D. B. Tower | New Hampshire. |
| H. K. Weber | Ontario. |
| C. E. Whitmore | Michigan. |
| E. Wicks | Ontario. |
| G. Wolcott | Michigan. |

## UNIVERSITY OF PENNSYLVANIA—DEPARTMENT OF DENTISTRY.

THE one hundred and forty-second annual commencement exercises of the University of Pennsylvania were held in the American Academy of Music, Philadelphia, on Wednesday, June 8, 1898, at 11 o'clock A.M.

The commencement address was delivered by Hon. John B. McPherson.

The number of matriculates for the session in the Department of Dentistry was four hundred and thirty-seven.

The degree of D.D.S. was conferred by Charles C. Harrison, A.M., LL.D., provost, upon the following graduates:

| NAME. | STATE OR COUNTRY. |
|---|---|
| Warren Babcock | New York. |
| Chas. H. Bankhead | Pennsylvania. |
| Minot V. Bastian | Massachusetts. |
| H. P. Beck, M.D. | Pennsylvania. |
| Thomas C. Beswick | Delaware. |
| William W. Booth | Pennsylvania. |
| C. L. Brininstool | New York. |
| Rudolf Bume, M.D. | Austria. |
| Jacob T. Butz | Pennsylvania. |
| H. P. Calais, M.D. | Germany. |
| Alonzo C. Caldwell | Canada. |
| Noble C. Campbell | Pennsylvania. |
| Karl E. Carlson | Minnesota. |
| Raymond F. Casler | New York. |
| William R. Chaplin | Georgia. |
| Joseph W. Cheyney | Pennsylvania. |
| James T. Coyle | New Jersey. |
| William L. Cramer | Connecticut. |
| E. G. Cunningham | Connecticut. |
| Michael J. Danahy | Massachusetts. |
| Charles F. Du Four | Pennsylvania. |
| Charles C. Dupont | Georgia. |
| Rich'd L. Entwisle | Pennsylvania. |
| John Erwin | Pennsylvania. |
| Joseph C. Farmer | New Jersey. |
| W. Van H. Filkins | New Jersey. |
| Walter H. Fordham | Pennsylvania. |
| Floyd C. Frederici | Pennsylvania. |
| Daniel L. Gallivan | Massachusetts. |
| W. Gardner, L.D.S. | Scotland. |
| J. H. Gartrell, L.D.S. | England. |
| Albert N. Gaylord | New York. |
| Paul E. Gires, M.D. | France. |
| Hans J. V. Grüter | Switzerland. |
| Joshua G. Hagee | Pennsylvania. |
| George G. Hansell | Pennsylvania. |
| Hugo C. Hark | Pennsylvania. |
| J. M. Hastings, Jr. | New York. |
| John I. Hay | Pennsylvania. |
| Clare M. Henry | New Jersey. |
| James K. Hunter | Ohio. |
| Zach. T. Jackaway | Pennsylvania. |
| Hiram C. Jacobs | Pennsylvania. |
| M. J. A. James | Canada. |
| Edward M. Jones | California. |
| P. C. Jones, D.D.S. | California. |
| William L. Keller | Pennsylvania. |
| Joseph Kussy | New Jersey. |
| Samuel E. Langfitt | West Virginia. |
| Eugene A. Lincoln | Massachusetts. |
| O. G. Longenecker | Pennsylvania. |
| Roy P. McCowan | Ohio. |
| David McGowan, Jr. | Ohio. |
| Fred'k E. McLaren | N. Hampshire. |
| Val'tine Macdonald | Australia. |
| Otto I. Metzger | New York. |
| John D. Millikin | California. |
| Carl T. Moehring | Germany. |
| T. B. Moorhead | Pennsylvania. |
| Clyde M. Naley | Pennsylvania. |
| Henry C. Newkirk | New York. |
| Charles H. O'Neill | Pennsylvania. |
| Bryon W. Palmer | New York. |
| Charles C. Payne | New York. |
| George Parry | Pennsylvania. |
| John W. Parsons | West Virginia. |
| Leroy E. Perkins | Pennsylvania. |
| Taliesin Phillips | Pennsylvania. |
| William D. Pursel | New Jersey. |
| David J. Reese | Pennsylvania. |
| Alex. H. Reynolds | Delaware. |
| Walter Richards | Delaware. |
| Franklin B. Roberts | Pennsylvania. |
| Edw. W. Robinson | England. |
| Alfred H. Sage | Connecticut. |
| Fred'k H. Saunders | Massachusetts. |
| A. R. Schermerhorn | Pennsylvania. |
| John G. Sears | New York. |
| Louis R. Seymour | Rhode Island. |
| Patrick W. Shields | Pennsylvania. |
| D. H. Shoemaker | Pennsylvania. |
| A. H. Sinsabaugh | Pennsylvania. |
| Samuel S. Smith | New York. |
| John Stearns | Rhode Island. |
| Marcus R. Stewart | Pennsylvania. |
| Leon B. Tantum | Pennsylvania. |
| C. R. Turner, A.B. | North Carolina |
| Ralph W. Waddell | Ohio. |
| Thomas B. Wade | Illinois. |
| Hans T. Waltisbühl | Switzerland. |
| George B. Weakley | Pennsylvania. |
| Walter Webb | Pennsylvania. |
| Fred F. Wood | New York. |
| A. W. Woodcock | Massachusetts. |
| H. H. Woodrow | Pennsylvania. |

## UNIVERSITY OF BUFFALO—DENTAL DEPARTMENT.

THE seventh annual commencement exercises of the Dental Department of the University of Buffalo were held, in connection with those of the Departments of Medicine and Pharmacy, at Music Hall, Buffalo, N. Y., on Tuesday evening, April 26, 1898.

Upon the recommendation of the faculty and by vote of the council, the chancellor conferred upon the following students, who had complied with all the requirements, the degree of Doctor of Dental Surgery:

| NAME. | STATE OR COUNTRY. |
|---|---|
| George W. Averell | New York. |
| Edward Barber | Ontario. |
| Edgar A. Bartlett | Ontario. |
| Charles W. Borland | New York. |
| William A. Bostwick | New York. |
| Byron A. Brown | New York. |
| George Brown | New York. |
| Jacob H. Brown | New York. |
| Charles F. Buckland | New York. |
| Harry D. Burghardt | New York. |
| Egerton B. Cays | Ontario. |
| Claude R. Christopher | New York. |
| John E. Cole | Ontario. |
| Arthur H. Consaul | Ontario. |
| Herschel J. Cull | New York. |
| Harry W. Day | New York. |
| George M. Decker | New York. |
| William B. Dills | New York. |
| Kernon J. Donahoe | New York. |
| John L. Dudley | Ontario. |
| Moss B. Eshleman | New York. |
| Raymond R. Evans | New York. |
| Frank L. Frank | New York. |
| Katharine M. Graf | New York. |
| Allen L. Green | New York. |
| John N. Hanna | New York. |
| Albert D. Heist | Ontario. |
| Harry C. Howell | Ontario. |
| George W. Jones | New York. |
| Albert H. Jung | New York. |
| Otto C. Kalbfleisch | Ontario. |
| Henry W. Kitching | New York. |
| Charles H. Laborn | New York. |
| Christian A. Landel | New York. |
| Clarence E. Lauderdale | New York. |
| Clinton H. McCallum | Ontario. |
| Arthur A. Mix | New York. |
| Herbert B. Morris | Ontario. |
| Robert Murray | Ontario. |
| Judson H. North | New York. |
| George A. Northup | New York. |
| William W. Paull | New York. |
| John R. Quigg | New York. |
| Harry B. Randall | Pennsylvania. |
| Grace G. Rankin | Ohio. |
| Howard F. Redfield | New York. |
| Earnest E. Rice | Ontario. |
| Samuel E. Salisbury | New York. |
| Edward L. Schlottman | New York. |
| William F. Sheahan | Ontario. |
| William D. Slacer | New York. |
| Miles M. Smith | New York. |
| Josephine H. Spellman | New York. |
| Louis A. Squires, Ph.B | New York. |
| Ella A. Staley | New York. |
| George Stevenson | Ontario. |
| Duncan Stewart | Ontario. |
| Eli Jay Sweet | New York. |
| Charles D. Tefft | New York. |
| John C. B. Tooke | New York. |
| George C. Van Marter | New York. |
| Francis H. Wallace | Ontario. |
| Louis E. Wettlaufer | Ontario. |
| Jay L. Wilson | New York. |
| Fred A. Woodmansee | Pennsylvania. |
| William D. Worrell | New York. |

## PHILADELPHIA DENTAL COLLEGE.

A SPECIAL commencement of the Philadelphia Dental College was held in the college amphitheater on the evening of June 1, 1898. The following were graduated:

| NAME. | STATE OR COUNTRY. |
|---|---|
| J. B. A. Boudreau | Canada. |
| Frederick C. Farr | New Jersey. |
| D. F. Henshaw | Massachusetts. |
| C. V. McCready | Canada. |
| Frank G. Moody | Canada. |
| N. D. Nicholaides | Greece. |
| Thomas A. Patterson | Pennsylvania. |
| Walter L. Paull | Pennsylvania. |
| C. Albin Refsnyder | Pennsylvania. |

## INDIANA DENTAL COLLEGE.

The nineteenth annual commencement exercises of the Indiana Dental College (Department of Dental Surgery of the University of Indianapolis) were held in English's Opera House, Indianapolis, Ind., on Tuesday evening, April 12, 1898.

The annual address was delivered by Dr. Joseph M. Matthews, of Kentucky.

The degree of D.D.S. was conferred on the following graduates by Professor Scot Butler, president of Butler College:

| NAME. | STATE. | NAME. | STATE. |
|---|---|---|---|
| Horace L. Baldwin | Illinois. | Joseph V. Ireland | Indiana. |
| Horace C. Beckes | Indiana. | Charles R. Jackson | Illinois. |
| Harry W. Bowers | Virginia. | Albert L. Jennings | Illinois. |
| Harry C. Carr | Indiana. | Harry E. Jackson | Indiana. |
| Vere M. Chappell | Indiana. | Charles F. Kraning | Indiana. |
| Rose M. Cooper | Indiana. | George L. Lane | Ohio. |
| Ray F. Coddington | Illinois. | Frank S. Martin | Indiana. |
| Patrick F. Campbell | Indiana. | Edgar D. McLaughlin | Minnesota. |
| Clarence W. Dicks | Indiana. | Arthur A. Metsker | Indiana. |
| James L. Dillon | Indiana. | Bennett F. Michael | Kansas. |
| Charles L. Davis | Indiana. | John W. McMillan | Indiana. |
| James H. Dean | Indiana. | Robert C. Mayhall | Indiana. |
| William A. Fox | Indiana. | Clarence E. Marsh | Indiana. |
| J. Wesley Fry | Illinois. | Joseph L. Masters | Indiana. |
| Everett B. Fewell | Indiana. | Everette L. Murphy | Indiana. |
| Louis P. George | Michigan. | Owen L. Mather | Indiana. |
| William D. Graham | Indiana. | W. Frank Purnell | Illinois. |
| Malcom T. Goodman | Indiana. | Arnet E. Ross | Indiana. |
| Albert Glick | Indiana. | Orton B. Smith | Indiana. |
| Geo. R. Gunder | Ohio. | Fred D. Sparks | Kansas. |
| Arthur Grimes | Indiana. | Harry B. Summers | Indiana. |
| Ellsworth Glenn | Indiana. | William G. Tull | Indiana. |
| E. Allen Hodges | Michigan. | Paul E. Vize | Kentucky. |
| Samuel G. Hoblit | Ohio. | John R. White | Indiana. |
| Wilber K. Harlan | Indiana. | Williams E. Walker | Indiana. |
| Charles L. Hallam | Illinois. | Henry A. Wahl | Indiana. |

## SOUTHERN MEDICAL COLLEGE—DENTAL DEPARTMENT.

The eleventh annual commencement exercises of the Dental Department of Southern Medical College were held in the Grand Opera House, Atlanta, Ga., on Saturday evening, April 2, 1898.

The annual oration was delivered by Professor George W. Macon, of Macon, Ga., and the valedictory by S. H. McAfee, D.D.S.

The number of matriculates for the session was eighty.

The degree of D.D.S. was conferred on the following graduates by Judge Howard Van Epps, president of the board of trustees:

| NAME. | STATE OR COUNTRY. | NAME. | STATE OR COUNTRY. |
|---|---|---|---|
| D. Clement | Georgia. | H. R. Parker | North Carolina. |
| Guy C. Estes | Florida. | John O. Pope | Alabama. |
| Jesse K. Floyd | Georgia. | E. E. Roy | Wisconsin. |
| D. M. Griffin | Florida. | L. A. Smith | Georgia. |
| J. C. Hill | Alabama. | E. M. Wilder | Georgia. |
| S. H. McAfee | Georgia. | Alton Whitman | Florida. |
| O. G. Pacetti | Cuba. | | |

## NORTHWESTERN COLLEGE OF DENTAL SURGERY.

The annual commencement exercises of the Northwestern College of Dental Surgery were held in the Auditorium, Chicago, Ill., on Thursday evening, April 7, 1898.

The salutatory address was delivered by L. A. Salisbury, and the valedictory by J. B. Curry, D.D.S.

The number of matriculates for the session was seventy-five.

The degree of D.D.S. was conferred on the following graduates by L. L. Davis, D.D.S., dean of the college and president of the board of trustees:

| NAME. | STATE. | NAME. | STATE. |
|---|---|---|---|
| W. E. Beil | Indiana. | G. Lindberg | Illinois. |
| C. W. Betcher | Minnesota. | H. H. Phillips | Michigan. |
| H. T. Berry | Illinois. | R. Pruitt | Illinois. |
| R. R. Bosworth | Illinois. | L. G. Rand | Illinois. |
| C. W. Bowbeer | Michigan. | G. R. Riddell | Illinois. |
| J. B. Curry | Wisconsin. | L. A. Salisbury | Illinois. |
| W. G. Dittmar | Illinois. | Jas. McC. Shaffer | Illinois. |
| E. O. Haese | Wisconsin. | U. Shantz | Canada. |
| R. R. Hutchinson | Minnesota. | J. F. Smith | Illinois. |
| E. X. Jones | Illinois. | E. J. Soik | Wisconsin. |

## BIRMINGHAM DENTAL COLLEGE.

The annual commencement exercises of the Birmingham Dental College were held at O'Brien's Opera House, Birmingham, Ala., on Tuesday evening, April 5, 1898.

The annual address was delivered by Judge J. J. Banks, and the valedictory by H. T. Hamblen, D.D.S.

The number of matriculates for the session was thirty-four.

The degree of D.D.S. was conferred on the following graduates by T. M. Allen, D.D.S., dean:

| NAME. | STATE. | NAME. | STATE. |
|---|---|---|---|
| J. W. Balkcom | Alabama. | H. T. Hamblen | Texas. |
| W. R. Dillard | Mississippi. | J. W. Kesy | Mississippi. |
| I. F. Drummond | Alabama. | H. N. McTyeire | Alabama. |
| C. F. Ellis | Texas. | R. L. Rogers | Georgia. |

## UNIVERSITY OF MINNESOTA—COLLEGE OF DENTISTRY.

The twenty-sixth annual commencement exercises of the College of Dentistry, department of the University of Minnesota, were held in the Armory Building, Minneapolis, Minn., on Thursday, June 2, 1898.

The degree of D.D.S. was conferred on the following graduates by President Cyrus Northrop, for the regents of the university:

| NAME. | STATE. | NAME. | STATE. |
|---|---|---|---|
| Almon G. Atwood | Minnesota. | Rolf J. Olson | Iowa. |
| Sydney E. Bennion | Minnesota | Frederick W. Prail | Minnesota. |
| William H. Card | Minnesota. | Edward H. Shibley | Minnesota. |
| Charles A. Couplin | Minnesota. | William E. Spencer | Minnesota. |
| John R. Hollister | Wisconsin. | E. J. Van Bronkhorst | Minnesota. |
| John R. Lawton | Minnesota. | Fred. K. Weible | North Dakota. |
| Christopher I. Newhouse | Minnesota. | Ernest A. Wright | Minnesota. |

## ROYAL COLLEGE OF DENTAL SURGEONS OF ONTARIO.

On the 21st of April the directors of the Royal College of Dental Surgeons of Ontario handed out the result of the examinations. The number of students registered for the session of 1897-8 was 201, the number in attendance being 198.

The following passed the final examinations, and received the title of L.D.S.:

| | |
|---|---|
| A. Almon Babcock | Ontario. |
| Harvey J. M. Bannerman | Ontario. |
| John W. Barker | Ontario. |
| Donald H. Beaton | Ontario. |
| George A. Beattie | Ontario. |
| Washington Buchanan | Ontario. |
| William H. Bulmer | Ontario. |
| Arthur C. Burnet | Ontario. |
| Mason J. Clarke | Ontario. |
| Joseph Coghlan | Ontario. |
| Chas. A. Cooke | Ontario. |
| Chas. W. Currie | Ontario. |
| Arthur Day | Ontario. |
| Robt. F. Denike | Ontario. |
| Adam R. Donaldson | Ontario. |
| Robert F. Edmonds | Ontario. |
| Robert R. Elliott | Ontario. |
| James B. Gerry | Ontario. |
| Frank W. Glasgow | Ontario. |
| Gordon Grant | Ontario. |
| John W. Hagey | Ontario. |
| Robert R. Harvie | Ontario. |
| Wm. J. Hill | Ontario. |
| Jas. A. Hilliard | Ontario. |
| Alfred E. Hunt | Ontario. |
| John Hutchison | Ontario. |
| Harry Jackson | Ontario. |
| Geo. G. Jordan | Ontario. |
| John A. Lambertus | Ontario. |
| Wm. H. Liddle | Ontario. |
| J. A. Locheed | Illinois. |
| Geo. A. Macoun | Ontario. |
| Samuel R. Martin | Ontario. |
| Stuart McL. Milne | Ontario. |
| Frederick D. McGrattan | Ontario. |
| Thomas R. Paterson | Ontario. |
| Samuel P. Reynolds | Ontario. |
| Andrew Scott | Ontario. |
| John Scott | Ontario. |
| Francis A. Sellery | Ontario. |
| Wilber G. L. Spaulding | Ontario. |
| Wm. D. Staples | Ontario. |
| Thomas W. Stoddart | Ontario. |
| James E. Taggart | Ontario. |
| Wm. F. Taylor | Ontario. |
| Adam H. R. Watson | Ontario. |
| Freeman Waugh | Ontario. |
| Walter J. Williams | Ontario. |
| Ogden A. Winters | Ontario. |
| Wm. H. Woodrow | Ontario. |

J. B. WILLMOTT, *Sec'y R. C. D. S.*

## TACOMA COLLEGE OF DENTAL SURGERY.

The annual commencement exercises of the Tacoma College of Dental Surgery were held at Chickering Hall, Tacoma, Washington, on Wednesday, April 6, 1898, at 8 o'clock P.M.

The closing announcement was delivered by J. M. Meyer, D.D.S., dean of the college; the valedictory by Geo. W. Stryker, D.D.S., and an address on the "Preliminary Education of Dental Students," by Professor J. L. Tait.

The number of matriculates for the session was thirty-three.

The degree of D.D.S. was conferred by J. W. Hickman, M.D., acting president of the college, upon the following members of the senior class:

| NAME. | STATE OR COUNTRY. |
|---|---|
| Francis Atwell | Idaho. |
| Henry D. Brand | Washington. |
| Andrew T. Carlson | Washington. |
| Clarence W. Chamberlin | Washington. |
| Willard M. King | Washington. |
| Edward H. Lennox | Washington. |
| Frank E. Morrison | Brit. Columbia. |
| George W. Stryker | Oregon. |
| Elmer E. Whittaker | Utah. |

## MISSOURI DENTAL COLLEGE.

The thirty-second annual commencement exercises of the Missouri Dental College (Dental Department of Washington University) were held at the Fourteenth Street Theater, St. Louis, Mo., on Thursday evening, April 28, 1898.

The number of matriculates for the session was one hundred and twenty-four.

The degree of Doctor of Dental Medicine was conferred by Chancellor Winfield S. Chaplin, of Washington University, upon the following graduates:

| NAME. | STATE OR COUNTRY. |
|---|---|
| Albert G. Alexander | Missouri. |
| Burt Barry | Illinois. |
| Charles T. Bedell | Missouri. |
| Chas. E. Bellchamber | Missouri. |
| John C. Boothe | Illinois. |
| Hermann Brandenberger | Missouri. |
| Ewing M. Brite | Missouri. |
| Otis C. Colby | Illinois. |
| Charles C. Crews | Virginia. |
| Murton E. DeGuire | Oregon. |
| Roy H. Ellis | Missouri. |
| Alfred Fellner | Austria. |
| George H. Frank | Missouri. |
| Walter B. Garrett | Missouri. |
| Harry B. Hammond | Missouri. |
| Esco T. Houston | Missouri. |
| Quillen O. Hudson | Missouri. |
| Charles J. W. Hugo | Missouri. |
| James W. Hull | Missouri. |
| Henry S. Kimbrough | Missouri. |
| Daniel M. Kelsey | California. |
| John P. Leibrook | Illinois. |
| George W. Loesch | Missouri. |
| Charles B. Mitchell | Missouri. |
| Edwin Moore | New York. |
| Edwin D. Morrow | Missouri. |
| Ernest L. Niemeyer | Illinois. |
| Benj. T. Owens | Texas. |
| Gilbert D. Pearce | Missouri. |
| Karl P. Pemberton | Montana. |
| Fred B. Rapp | Missouri. |
| Edw. C. Reisse, Ph.D. | Missouri. |
| Noble G. Rhodes | Missouri. |
| Huntington Sandel | Louisiana. |
| Carl Schaer | Switzerland. |
| Rolla A. Schwaner | Iowa. |
| George W. Smith | Illinois. |
| James D. Smith | Missouri. |
| Don Stocker | Missouri. |

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## WESTERN RESERVE UNIVERSITY—COLLEGE OF DENTISTRY.

The annual commencement exercises of the College of Dentistry of Western Reserve University were held in Association Hall, Cleveland, Ohio, on Tuesday evening, May 17, 1898.

Addresses were delivered by Professor H. L. Ambler, dean of the college, and by Rev. Dr. Louis A. Banks.

The number of matriculates for the session was ninety-one.

The degree of D.D.S. was conferred on the following graduates by President Charles F. Thwing, D.D.:

| NAME. | STATE. |
|---|---|
| Fred F. Chapman | Ohio. |
| Foster O. Dudgeon | Ohio. |
| Charles S. Draime | Ohio. |
| Calvin R. Edson | Ohio. |
| Charles D. Elder | Ohio. |
| Isidor Englander | Ohio. |
| Albert C. Fisher | Ohio. |
| Wm. W. Gillen | Ohio. |
| Penrose T. Haight | Pennsylvania. |
| George E. Hervey | Pennsylvania. |
| Thomas B. Johnson | Ohio. |
| Edward R. Kelley | Ohio. |
| Herman C. Kenyon | Ohio. |
| Percy E. Maddock | Ohio. |
| Frank R. Mathews | Ohio. |
| Joseph W. McDill | Iowa. |
| John A. McGannon | Ohio. |
| Francis J. McGannon | Ohio. |
| Frank E. Noland | Ohio. |
| Everett E. Quirk | Michigan. |
| John B. Reeves | Ohio. |
| Oliver W. Renkert | Ohio. |
| Edward B. Rogers | Pennsylvania. |
| James F. Rybak | Ohio. |
| Park E. Sprague | Ohio. |
| Leon C. Vincent, Ph.B | Ohio. |
| Robert H. Wallace | Ohio. |

## NATIONAL UNIVERSITY—DENTAL DEPARTMENT.

THE fourteenth annual commencement exercises of the Dental Department of the National University were held in the National Theater, Washington, D. C., on Wednesday evening, June 8, 1898.

The address to the graduating classes was delivered by Professor John T. Winter, M.D., and the valedictory by Seneca B. Bain, D.D.S.

The degree of D.D.S. was conferred on the following graduates by Hon. Richard H. Alvey, LL.D., chancellor of the university:

| NAME. | STATE OR COUNTRY. | NAME. | STATE OR COUNTRY. |
|---|---|---|---|
| P. Bonnard Bain | Texas. | Roue L. Hogan | Nova Scotia. |
| Seneca B. Bain | Texas. | Thos. J. McConnell | Indiana. |
| Charles H. Beach | Kentucky. | Rosalind Moore | Dist. of Col. |
| Silas C. Ellis | Missouri. | Harry R. Perry | Dist. of Col. |
| Chas. H. Fischer | New York. | Chas. W. Radley | New York. |
| Ernest W. Fowler, M.D. | Dist. of Col. | Jesse B. Schafhirt | Dist. of Col. |
| Wm. S. Frankland | Dist. of Col. | Edward S. Smith | Dist. of Col. |
| Albert F. Hodes | New York. | Lena B. Watson | Louisiana. |

## BALTIMORE MEDICAL COLLEGE—DENTAL DEPARTMENT.

THE third annual commencement exercises of the Dental Department of the Baltimore Medical College were held in Ford's Opera House, Baltimore, Md., on Wednesday evening, April 6, 1898.

The oration was delivered by Rev. Curtis Lee Laws.

The degree of D.D.S. was conferred on the following graduates by S. K. Merrick, M.D., president of the college:

| NAME. | STATE OR COUNTRY. | NAME. | STALE OR COUNTRY. |
|---|---|---|---|
| William T. Auer | Maryland. | George M. Maxwell. | Maryland. |
| Richard F. Bartlett | Maryland. | James M. McFarland | Louisiana. |
| Walter C. Dorsey | Maryland. | Peter McNichol | Canada. |
| Justus H. Ehlers | Maryland. | William G. Nixon | Virginia. |
| Jesse D. Gardner | North Carolina. | Silas W. Pope | New York. |
| James F. Gilbert | Rhode Island. | Oren B. Richards, Jr. | Pennsylvania. |
| William J. Johnson | Canada. | Franklin C. Smith | Virginia. |
| August M. Marchant | Virginia. | Hubert L. Sprackling | Rhode Island. |
| Louis H. Marshall | Massachusetts. | George G. Yarrow | Massachusetts. |

## UNIVERSITY OF COLORADO—DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the University of Colorado were held at the St. James Hotel, Denver, Col., on Thursday evening, April 28, 1898.

The address to the graduates was delivered by Dr. Wm. T. Chambers, dean, and the valedictory by W. A. Brierley, D.D.S.

The degree of D.D.S. was conferred on the following graduates by Dr. H. A. Fynn, president of the college:

| NAME. | STATE OR COUNTRY. | NAME. | STATE OR COUNTRY. |
|---|---|---|---|
| Mahlon F. Bauchert | Indiana. | Henry F. Hoffman | Colorado. |
| Mary R. Bradner | Colorado. | Ernest D. Linton | Ohio. |
| William A. Brierley | Massachusetts. | James L. McMurray | New York. |
| Robert Dunn | Colorado. | Adam Turnbull | Scotland. |
| Belle R. Hinrichs | California. | George R. Warner, Jr. | Connecticut. |

## NEW YORK DENTAL SCHOOL.

THE fifth annual commencement exercises of the New York Dental School were held in the Academy of Medicine, New York city, on Thursday, May 26, 1898.

The annual address was delivered by Rev. Joachim Elendorf, D.D.

The number of matriculates for the session was forty-seven.

The degree of D.D.S., from the University of the State of New York, was conferred on the following graduates by Dwight L. Hubbard, M.D., dean of the college:

| NAME. | STATE OR COUNTRY. |
|---|---|
| Frank Abel | New York. |
| J. V. Andrews | New York. |
| C. W. Bedford | New York. |
| Carl Klindt | New York. |
| Nils Odahl | Sweden. |
| Wm. C. Rothkranz | New York. |
| Wm. Stack | New York. |
| Carra Ulman | New York. |
| H. D. Westfehling | New York. |

## COLUMBIAN UNIVERSITY—DENTAL DEPARTMENT.

THE eleventh annual commencement exercises of the Dental Department of the Columbian University were held in Convention Hall, Washington, D. C., on Wednesday evening, June 1, 1898.

The commencement oration was delivered by Hon. Jonathan P. Dolliver, of Iowa.

The degree of D.D.S. was conferred on the following graduates by Rev. B. L. Whitman, D.D., president of the university:

Edwin H. Bogley.
Geo. W. Boynton.
Fenton Bradford.
Philip J. Dahlen.
James C. Dunne.
Hopkins Gibson.
Jacob A. Gorman.
Fessenden F. Hicks.
Henry W. Johnson.
Charles B. Keefer.
J. O. A. Kauschke.
William E. Naff.
E. Clyde Shade.
A. Thomas Utz.
Orville Van Deusen.

## WASHINGTON DENTAL COLLEGE.

THE first annual commencement of the Washington Dental College was held Thursday evening, May 5, 1898, in the college building, Washington, D. C.

The address to the graduates was delivered by Professor W. Warrington Evans, M.D., D.D.S., president of the faculty.

The number of matriculates for the session was twenty-six.

The degree of D.D.S. was conferred on the following graduates: Wm. F. Baron, New Jersey, and Geo. C. Patton, Chicago, Ill.

## CENTRAL COLLEGE OF DENTISTRY.

THE first commencement exercises of the Central College of Dentistry were held in the college building, Indianapolis, Ind., on Tuesday, April 11, 1898.

Addresses were delivered by Bishop White, of Indiana, and Dr. Joseph Eastman.

The number of matriculates for the session was twenty-four.

The degree of D.D.S. was conferred by Dr. Junius E. Cravens, president of the college, upon one graduate, William H. Matthews, of Indiana.

The college closed its first session with much satisfaction to the management and students.

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## HOWARD UNIVERSITY—DENTAL DEPARTMENT.

The annual commencement exercises of the Dental Department of Howard University were held in the Congregational Church, Washington, D. C., on Friday evening, May 6, 1898.

The annual address was delivered by J. E. Rankin, D.D., LL.D., president of the university, and the address to the graduates by Professor D. S. Lamb, A.M., M.D.

The number of matriculates for the session was twenty-four.

The degree of D.D.S. was conferred on the following graduates by President J. E. Rankin: Richard G. Baker, Pennsylvania; Raymond F. Crist and Clifton A. Johnson, Washington, D. C.; John E. Rattley, North Carolina; Riuzo Sohne, Japan.

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## UNIVERSITY OF DENVER—DENTAL DEPARTMENT.

The seventeenth annual commencement exercises of the Dental Department of the University of Denver were held in Trinity M. E. Church, Denver, Col., on Tuesday evening, May 10, 1898.

The address to the graduating class was delivered by Dr. A. H. Sawins, dean.

The number of matriculates for the session was forty-seven.

The degree of D.D.S. was conferred on the following graduates by Chancellor McDowell, of the university: Lucas H. E. Barnum, Kansas; Gen Rio Hara, California; Jay R. Haskin and Henry A. MacMillan, Colorado; Clarence S. Wilkinson, Illinois.

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# DENTAL SOCIETY ANNOUNCEMENTS.

## CALIFORNIA STATE BOARD OF DENTAL EXAMINERS.

The annual meeting of the California State Board of Dental Examiners will be held the second Tuesday in August, 1898, in San Francisco. All applicants should notify the secretary of their intention of taking the examination.

W. A. Moore, *Secretary,*
Benicia, Cal.

## UNION MEETING IN NOVA SCOTIA.

The joint convention of the New Brunswick and Nova Scotia Dental Associations will be held on Thursday and Friday, September 1 and 2, 1898, at Digby, Nova Scotia. An excellent program, consisting of interesting and instructive clinics, papers, etc., will be presented. An excursion over the beautiful harbor to the historical town of Annapolis Royal is contemplated, as well as other interesting features, to make our meeting thoroughly enjoyable.

A cordial invitation is extended to all dentists to attend our meeting.

United States dentists should spend their vacation in our beautiful provinces.

Geo. K. Thomson, D.D.S.,
*Chairman Executive Committee,*
St. Paul Building, Halifax, N. S.

## EASTERN ONTARIO DENTAL ASSOCIATION.

The nineteenth annual meeting of the Eastern Ontario Dental Association will be held at Brockville, on July 14 and 15, 1898.

Geo. H. Weagant, *Sec'y-Treas.*

## MAINE DENTAL SOCIETY.

The thirty-third annual meeting of the Maine Dental Society will be held in Portland, Maine, on Tuesday and Wednesday, July 19 and 20, 1898.

H. A. Kelley, *Secretary,*
609 Congress st., Portland, Me.

## NORTH DAKOTA BOARD OF DENTAL EXAMINERS.

The next meeting of the North Dakota State Board of Dental Examiners will be held at Fargo, North Dakota, July 12 and 13, 1898; and a meeting for the reorganization of the State Dental Society immediately following on the 14th and 15th.

H. L. Starling, *Secretary,*
Fargo, N. Dak.

# EDITORIAL.

## ALUMINUM AND MERCURY.

There are occasions when the work of a dental editor furnishes problems not easy of solution. By constant practice and the training which his field of labor yields, the work of putting into intelligible English the mass of matter which comes to him from all sources gets to be a simple question of routine work. In fact, the major portion of the matter submitted for publication requires but little editing other than that necessary to eliminate redundancy of language and prevent repetition of ideas unduly. Occasionally the editor may differ with a writer as to the literary style of his treatment, and the difference may easily be one which does not involve a question of the correctness of a writer's style except in so far as it is related to the general character of the publication in which it is to appear. A certain formality of dress has come to be the accepted garb in which articles of a technical or scientific character are issued. Hence in the editing of work of that kind it becomes routine practice to so editorially shape an article for publication that it shall conform to the standard noted.

Very occasionally a writer can depart from a more or less formal style to advantage, and we present in this issue a paper by Dr. A. E. Preston which is a good illustration of the point in question; it further furnishes an example of an editorial problem of some difficulty, just because it is a departure from beaten paths. It is of course a literary possibility to restate his presentation of facts in a technical and formal way, but the attempt to do so robs the article of certain elements which in its present form give it positive value. The salient and practical features of his experience with aluminum crowns in contact with amalgam acquire a certain vividness from the glimpse of domestic life included in his report, which would have been a positive loss had it been omitted. And, after all, as it is the function of language to impart ideas, it must be conceded that that language is best which most clearly imparts the ideas intended. Viewed by that standard, we doubt if any reader of Dr. Preston's article will retain a lingering doubt as to the possibility of amalgamating aluminum.

The affinity of aluminum for mercury has been frequently doubted, but the doubt has been due to a general lack of knowledge of the properties of the "new metal." At the period of its first commercial introduction following the invention of the Cowles electric furnace, which cheapened its cost of production within commercial limits, the most absurd claims were made about aluminum, especially as to its resistance to solvents and its great strength. Newspaper scientists proclaimed it as the strongest of metals, unaffected by oxygen or by acids. A closer acquaintanceship with the metal has shown that the strength claimed for it should be credited to its alloys, and that while it resists in a marked degree the action of strong nitric acid, it is soluble with comparative ease in most of the other acids, the alkaline hydroxids, and some saline solutions.

The studies of its resistance to oxygen and oxidizing agents seem to point to the fact that its lack of affinity for oxygen is apparent rather than real, and due to a superficial film of oxid which, when once formed, protects the subjacent metal from further action. Its resistance to mercury is of like character, but when absolute contact of the two metals is secured amalgamation proceeds rapidly. Absolute contact in this case is readily secured by the use of a solution of one of the alkaline hydroxids in connection with the mercury, the solution rapidly removing the superficial film from the aluminum and enabling union of the mercury with it to take place. When union of mercury and aluminum has once occurred, the fine state of molecular division in which the aluminum exists in its mercurial solvent enables its inherent affinity for oxygen to manifest itself so that the aluminum amalgam rapidly undergoes decomposition by union of the aluminum with atmospheric oxygen, the mass meanwhile swelling up, becoming spongy in character, and quite hot. The union of aluminum and mercury, with the subsequent oxidation of the aluminum, may be beautifully studied under the microscope by amalgamating an aluminum surface and then quickly placing the sheet of amalgamated metal on the stage of the instrument, when the decomposition of the amalgam will proceed rapidly with the formation of alumina, which sprouts as a white efflorescence from the metallic surface like a sudden growth of mold.

This affinity of aluminum for mercury is a sufficient reason why contact of the two metals should be avoided in dental work, as is shown in the interesting report by Dr. Preston before alluded to.

## THE APPOINTMENT OF MR. CHARLES S. TOMES.

We note with much satisfaction the appointment of Mr. Charles S. Tomes, F.R.S., F.R.C.S., L.D.S., of London, as a Crown Representative, for five years, on the General Medical Council of Great Britain.

Not only is the appointment a well-deserved public recognition of the attainments of a distinguished member of our profession, but it has a much deeper significance in that it marks an important step in the acknowledgment by the public and particularly by the medical profession of the claims of dentistry to recognition as a professional calling.

The question of professional recognition for dentistry is one which has agitated all classes of dental practitioners and on both sides of the Atlantic. To those who from the beginning studied the subject broadly and without prejudice it was evident that recognition would be accorded when it was deserved, not before; that the only way to compel the coveted recognition was to so improve the educational equipment of the practitioner that his professional qualification would not be questioned.

Among the pioneer leaders who did most to give practical expression to the principle noted was Sir John Tomes, father of the newly elected Crown Representative on the General Medical Council, and it is a fitting outcome of the valuable labors of Sir John Tomes in elevating dental professional standards that the culmination of his efforts should be publicly and officially reached in the appointment of his distinguished son to the important position he now holds.

We congratulate our English confrères upon this advance step in their professional welfare, and the dental profession at large upon the achievement of a precedent that marks a further strengthening of the bonds which unite us to the great parent of all departments of the healing art.

## DENTISTS IN THE ARMY AND NAVY.

We here direct attention to a letter from Dr. Chas. C. Stanley, published at page 558 of this issue, which is self-explanatory.

The subject of appointing dentists in connection with the army service has taken practical shape by the introduction of a bill in the House of Representatives by Mr. Otey, of Virginia, through the instrumentality of Dr. R. W. Morgan, of Lynchburg, Va.

The bill is designated as H. R. 10,508, and provides for an increase in the Medical Corps of the United States Army by the addition of a dental corps, to be composed of one surgeon dentist to each brigade with rank of major, and one surgeon dentist to each regiment with rank of captain, etc.

As the initial step in securing the desired legislation has been taken, it is important that the bill be modified to such extent as may be necessary to best subserve dental interests in that relation, and that the needful effort to secure its passage by Congress be made at once, so as to avoid the prestige of defeat, which would necessarily impede any subsequent legislative effort in this direction.

## EXCURSION TO NATIONAL DENTAL ASSOCIATION MEETING.

Preliminary announcement is here made of an effort now in progress to arrange for a special excursion for those members of the dental profession living east of the Allegheny Mountains who wish to attend the coming meeting of the National Dental Association at Omaha, August 30, 1898.

Full particulars as to itineraries, expenses, etc., will be published in the August issue of the DENTAL COSMOS.

# BIBLIOGRAPHICAL.

A TEXT-BOOK OF DENTAL PATHOLOGY AND THERAPEUTICS, INCLUDING PHARMACOLOGY. Being a Treatise on the Principles and Practice of Dental Medicine, for Students and Practitioners. By HENRY H. BURCHARD, M.D., D.D.S., Special Lecturer on Dental Pathology and Therapeutics in the Philadelphia Dental College. Illustrated with 388 engravings and two colored plates; pp. 575 and index. Lea Brothers & Company, Philadelphia and New York, 1898. Price, cloth, $5.00; leather, $6.00 net.

The tendency of growth in pathological study and research has been toward a more scientific and therefore rational exposition of the complex phenomena presented by morbid processes. The atmosphere of doubt and uncertainty which was the necessary result of empiricism in connection with this important field of study is being gradually dispelled by the scientific investigations which are giving us correct data as to the etiology of disease processes, and are developing our systems of therapeutics upon rational lines.

The discovery of the bacterial factor in the causation of disease revolutionized therapeutics in conformity with its needs, and gave to prophylaxis an importance not before possible. The recognition of relative degrees of resistance to bacterial infection has stimulated interest in the problem of immunity and the means for its attainment, so that a most fruitful field, one fraught with the greatest importance, is opened up for investigation as a necessary outgrowth of the discoveries already made in the domain of pathological research. These developments have revolutionized not only the older views on pathology, but have changed its methods and consequently the manner of its exposition.

That portion of the general subject pertaining to dental pathology has not only participated in the changes noted, but its own special field has been undergoing a development which has resulted in changes fully as radical as those which have taken place in the general subject.

As a consequence, the need for an exposition of dental pathology in harmony with its advanced status has become imperative.

Teachers as well as students have been handicapped in their work for lack of a suitable text-book on the subject. We believe that this need has been adequately met in the work of Dr. Burchard. It is a presentation which is a faithful reflection of the present state of the knowledge of the subject of which it treats, and its method of exposition is in accord with the rational basis upon which the structure of modern pathology is being rapidly erected. But it is even more than an exposition of the present status of the subject. There are throughout the work evidences of original thought which all tend toward shaping the lines upon which future study of the subject is almost surely to proceed. It is this comprehensive quality and the basis it gives for an intelligent, progressive understanding of the subject which more than all else gives value to the work.

In the treatment of the subject the method pursued by the author is logical and sequential. The general principles of pathology are set forth in the first section, and form the basis of exposition for the entire subject. There is much in this portion of the work that is worthy of special commendation, notably the comprehensive and broad treatment of general nutritive disturbances of the body. The importance of this question as affecting dental and oral diseases is only beginning to be clearly recognized, but its direct bearing upon immunity and prophylaxis is too evident to be ignored, and must therefore become a factor in the educational equipment of future practitioners of dentistry as well as of medicine.

The special applications of general principles to dental and oral diseases are elaborated in the succeeding sections which, with a section upon dental pharmacology, complete the work. It is not possible that the views set forth will in every instance be accepted without dispute and opposition, but, so far as a somewhat imperfect examination can determine, they are not only in the main correct, but are in harmony with the best knowledge at present attainable on the subject. The author, as stated in his preface, has set for himself the task of "formulating, from data obtained from every available source, a system of dental pathology and therapeutics of which the several parts shall be in harmony with one another and also with the collateral sciences involved," and we are of the opinion that he has thoroughly accomplished his object.

In doing this he has not only filled a long-felt want by giving to the dental profession a valuable text-book on a subject which has heretofore not been adequately represented in that form, but the book is one which will undoubtedly help to mold the trend of thought with respect to dental pathology in correct lines for the future.

If criticism were to be made upon a work so generally satisfactory, it might be said that the section upon dental pharmacology needs further elaboration to give it consistency with the rest of the work. Dental pharmacology, materia medica and therapeutics, has grown to an importance which really demands a separate work for its full exposition.

MECHANICAL PRACTICE IN DENTISTRY. By WILLIAM BOOTH PEARSALL, F.R.C.S.I., etc. Claudius Ash & Sons, London and New York.

One of the British dental journals some months ago took exception to the use of the phrase American Text-Books of Dentistry as applied to two volumes issued in this country, and in a broad sense it may be conceded that dental practice is sufficiently cosmopolitan to nullify the correctness of such a title, but that it does have a special significance is verified by an examination of Mr. Pearsall's work. Indeed, it may be seriously asked whether the book in question is not written and issued as a presentation of mechanical dentistry as practiced in Great Britain in contrast with the methods set forth in standard American text-books on the subject.

To the American reader and practitioner the present volume represents a practice almost entirely foreign to him,—a practice not only novel to him, but one which he is scarcely likely to adopt, except in some minor phases, for the simple reason that it does not constitute an improvement upon his present methods of procedure.

Many of the appliances and apparatus appear to be crude and needlessly cumbrous, if one can judge from the illustrations, which are of a character far inferior to those in ordinary use in technical text-books of the same class. Good illustrations are no longer a luxury, but a necessity to a ready comprehension of the subject matter, and it is an offense to good taste to embellish a work of this character with process reproductions of drawings which are both incomplete and crude.

Another questionable innovation in this work which crowds closely upon the grounds of professional ethics is the introduction of an appendix of some one hundred pages of illustrations of instruments, which but for the lack of prices attached might serve as the advertising catalogue of their manufacturer.

The chapters upon crown- and bridge-work are inadequate, and show an unfamiliarity with the accepted advances in that branch of dental mechanics.

The well-known originality of the author is exemplified in many instances by the introduction of matter descriptive of his own devices and methods, which are the best things the book contains, and it is for these features that the book will excite interest. His system of dies and counter-dies is particularly good, and should be generally adopted.

While this sketch of the impression made by the present volume may appear harsh, it is not so when addressed to American readers of a special class. Were any other verdict rendered it would fall short of the truth as the reviewer sees it. Were the author's own work presented by itself, it would fully justify the high estimation in which Dr. Pearsall is held by his many friends in America for his progressive originality and ingenuity in this special department, as well as in the entire field of dental practice.

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# OBITUARY.

## DR. ALFRED PORTER SOUTHWICK.

Died, at his residence in the city of Buffalo, N. Y., June 11, 1898, Alfred P. Southwick, M.D.S., aged seventy-two years.

Dr. Southwick was born in Ashtabula, Ohio, in 1826. He was early thrown upon his own resources, and this developed in him a self-reliance and independence of thought that was always characteristic of the man. When he attained manhood he moved to the city of Buffalo and became a steamboat engineer, a vocation for which he had fitted himself, and in 1855 was made chief engineer of the Western Transit Company. This life was not congenial to him, and about 1862 he commenced the practice of dentistry, which he had been studying for more than five years. He rapidly developed an unusual degree of practical skill, and from that time until the day of his death was recognized as a leading member of his profession.

He was one of the organizers of the State Dental Society in 1868, and for the past twenty-one years he had served it as one of the State Dental Examining Board, and for twelve years had been the chairman of the board. He was one of the founders of the Dental Department of the University of Buffalo, and since its organization had been its secretary-treasurer. He was one of the earliest of the teachers of operative technics in our colleges, and had developed remarkable ability as an instructor, his department being one of the most effective of the college.

Dr. Southwick was a man of sterling integrity. During his whole life no one ever accused him of a dishonorable action, unless it was plainly an act of malignity. His word might offset the oath of another. His religion was to deal by other men as he would have them deal with him, and in the strong confidence of his well-preserved faith he approached his death calmly, unshrinkingly. His kindness of heart was proverbial, and the students under his charge loved and obeyed him, and sought his counsel as they would that of a father.

At a meeting of the Faculty of the Dental Department of the University of Buffalo, held June 12, the following resolutions of respect were unanimously adopted, and ordered sent to the DENTAL COSMOS and the *Dental Practitioner* for publication:

"The Faculty of the Dental Department of the University of Buffalo have great reason to deplore the death of Dr. A. P. Southwick. In his school work he was most devoted to all that stands for integrity and efficiency. In his relations with teachers and students alike he was the soul of honor, while always kind, genial, and generous. Never censorious nor critical among his fellow-practitioners, he was yet a model by which they might well regulate both their conduct and their practice.

"In the history of dentistry in this state, and indeed this country, he will remain ever a conspicuous figure; since from the outset of his career he strove always for higher standards, and the elevation to the dignity of a profession of what had been scarcely more than a vocation.

"In the records of the State Dental Society it will be noted that he was, from its organization in 1868, an active member. For the past twenty-one years he was a Censor; guarding faithfully its interests, and joining prominently in every movement that promised progress and improvement in its work.

"As a citizen and a man he was upright, fearless, and energetic. Throughout his career he showed always those sterling traits which enabled him early to rise from a humble position to the height which he attained in his chosen profession. Faithful always, active to the last, never weary of well-doing, he finally succumbed beneath a burden of disease which few men could so long have carried; and dying at the end of a long and well-spent life, he has left behind him an illustrious example which all will do well to follow.

"This Faculty, therefore, cherishing his memory and keenly feeling his loss, wish to spread this expression of their sentiments upon their records, and transmit it, as well, to his family and friends.

"GEORGE B. SNOW, *Registrar*."

## DR. WM. LAWRENCE JOHNSON.

Dr. JOHNSON was born at Newburyport, Mass., April 19, 1826, and began the study of dentistry with Dr. Crowfut, of that place. He began the practice of his profession at Exeter, N. H., continuing until 1885, a period of forty-two years, when he gave up dental practice to enter upon the manufacture of "health foods" derived from whole wheat. He was the inventor and introducer of the so-called "Educator Crackers." His interest in dietetics was the outgrowth of his desire to so improve the nutrition of the teeth that they would more effectually resist the invasion of dental caries.

Dr. Johnson was an expert in porcelain block carving, and was said to be the first dentist to produce a denture on the vulcanite base in New England, the vulcanizing being done in a steam box in a ship-building yard. It is also claimed for him that he was the inventor of the serrated dental plugger. He purchased the first apparatus for the administration of ether from Dr. Morton, which is believed to be the only piece of Dr. Morton's apparatus extant, and which will be presented to the National Museum at Washington.

Dr. Johnson was married, in 1848, to Miss Sarah Bagley, of Salisbury, Mass., who with three daughters and a son survives him. He was a graduate of the Boston Dental College.

## DR. ARTHUR R. GAGE.

The announcement of the death of Dr. Gage came as a surprise to his many friends, as he gave up practice but a few months ago for the purpose of seeking rest and health. His death occurred at his country residence at Liberty, Sullivan county, New York, June 3, 1898, from tubercular laryngitis. Dr. Gage was born at Burlington, Mass., August 24, 1857. He began the study of dentistry under the preceptorship of Dr. Latimer, completing the course at the Philadelphia Dental College, from which he graduated in February, 1878. He was an associate member of the Stomatological Society of New York, and was a careful, painstaking operator, and one who always upheld the higher standards of his profession.

Dr. Gage was married, April 24, 1889, to Miss Eugenie A. Wagner, who survives him.

## PERISCOPE.

Ichthyol in Dentistry.—Dr. H. Floris (*Poulson's Bericht*, 1897, No. 14) reports having used ichthyol with very excellent results in alveolar pyorrhea, and in painful receded gums. In the former case, the undiluted ichthyol is employed for swabbing the alveolar cavities by means of a pledget of cotton fastened to a gold needle. They are besides syringed twice or thrice a week with a warm fifty per cent. solution of ichthyol, the mouth being also daily rinsed twice with a solution of from ten to fifteen drops of ichthyol to a half-glass of warm water, and after previous massage. In receded, painful gums, and in cases where the teeth are sensitive to change of temperature, touch, sweets, certain fruits, etc., the undiluted ichthyol is painted on the sensitive part twice or thrice a week, with a camel's-hair pencil, with the result that in from two to three weeks permanent relief from pain is had. In this respect the preparation is greatly superior to the remedies usually employed, such as silver nitrate, for instance, since it exerts no caustic effect nor causes discoloration.

The writer has also employed the remedy with remarkable results in hemorrhages following extractions, the most severe being rapidly checked by inserting a tampon of twenty-five per cent. ichthyol-cotton into the cavity, and retaining it in place by the usual means.—*Amer. Medico-Surgical Bulletin.*

The Comparative Value of Holocain and Cocain.—An extended study of the comparative value of these two local anesthetics has been made by Dr. Lagrange and Dr. Cosse, of Bordeaux (*Bulletin médical; Nouveaux remèdes*, February 8, 1898). The results obtained are as follows: In normal eyes the anesthetic power of the two drugs is very nearly the same; in an inflamed eye, on the contrary, holocain gives a more rapid and complete anesthesia, and does not have the destructive effect on the corneal epithelium so often seen after the use of cocain; hence it should be substituted for the latter in cases requiring continued application to an inflamed conjunctiva or cornea. In operations on the muscles or for pterygion, or in any cutting operation in which it is desirable to limit the amount of hemorrhage, holocain is found to be more desirable. In all cases, on the other hand, in which a diminution of the intraocular tension is desired, cocain should be used.—*New York Med. Journal.*

Chloroform Anesthesia by Gaslight.—An unusual accident recently happened in the Catholic Hospital at Herne, in Westphalia. A man who had been shot in the abdomen was brought to the hospital at night and immediately operated upon by gaslight. The operation was very difficult, and the chloroform narcosis was kept up for four hours. As a result of the decomposition of the chloroform by the gaslight, producing powerful chlorinated vapors, two of the surgeons and several of the Sisters of Mercy were overcome, and one of the latter has since died.—*Med. News.*

Death through Swallowing a Tooth.—The death of Elizabeth Knight, in whose lungs a tooth had been found during the post-mortem examination, formed the subject of a lengthy inquiry by the city coroner, at Adelaide, in December last. The deceased had had all her teeth extracted by Benjamin Wm. Thompson, practicing in King William street, Adelaide, on October 1, when, according to Thompson, one of the teeth "seemed to shoot through the forceps." "Not being sure if the tooth had passed out of the mouth," Thompson stopped operating and cleared the mouth of blood with a sponge, and unsuccessfully felt for the tooth underneath the patient's tongue; "listened to her breathing; everything appeared to be regular, and there seemed to be no obstruction of any sort, and he (Thompson) naturally thought the tooth had gone onto the floor." The woman shortly afterward complained of a painful cough. The application of the Roentgen rays and the opening of the windpipe failed to discover any foreign substance; but upon the patient's death a tooth was found imbedded in one of the smaller divisions of the bronchial tube. The cause of death was exhaustion,—the result of pulmonary abscess and empyema,—due to the tooth being in the portion of the lung structure.—*Australasian Journal of Pharmacy.*

The Treatment of Alveolar Pain after the Extraction of Teeth.—The *Lyon médical* for November 28, 1897, contains an abstract from the *Bulletin médical* for November 17, 1897, attributing the following suggestions to certain American dentists, one of whom is Dr. F. H. Morgan:

Remove the blood-clots from the socket of the tooth by means of a little absorbent cotton wound on a match, and then syringe the cavity with very hot water, either plain or containing a little carbolic acid. If this does not answer, insert a tampon of cotton or bibulous paper soaked in camphorated phenol or in one of the following solutions:

1. ℞—Menthol,
 Chloral hydrate, āā 4 parts;
 Camphor, 2 parts;
 Alcohol, 30 parts. M.

2. ℞—Chloroform,
 Alcohol,
 Tincture of aconite, āā 100 parts;
 Morphin, 1 part. M.

Brenzcain.—Brenzcain, pyrocatechinmethylbenzyl ether, guaiacolbenzyl ether, occurs in the form of colorless crystals, soluble in alcohol and in ether, and melting at 62° C. This preparation has been introduced as a succedaneum for guaiacol. It is said to be free not only from the caustic action that guaiacol exerts on mucous membranes, but also from the other drawbacks of the latter, while possessing all its advantages. Brenzcain has been employed by Dr. Marcus (E. Merck's 1898 *Bericht*, p. 33), in conjunction with cocain hydriodate, for producing local anesthesia by cataphoresis, in dentistry. Investigations are now under way to determine to what extent brenzcain may replace guaiacol and its compounds in tuberculosis. Brenzcain dissolves best in vasogen, and in such solution it may be exhibited like the other guaiacol compounds and in similar doses.—*American Med.-Surg. Bulletin.*

Poisoning by the Use of Cataphoresis.—Dr. Moore, of Frankfort-on-the-Main, gave an account of a case of poisoning by cocain, transmitted by an electric current. After close inquiry to discover the cause of the accident, he was convinced that the apex of the tooth was very large, and that the cocain was rapidly thrown into the system.—*Dominion Dental Journal, from Zahnarztliches Wochenblatt-Odontologie.*

Prescription Incompatibility.—Dr. Daclin calls attention (*Méd. mod.*) to the incompatibility of cocain hydrochlorate and cherry-laurel water. The cocain becomes precipitated in the form of a cyanide (cherry-laurel water, as is well known, contains hydrocyanic acid).—*Amer. Medico-Surgical Bulletin.*

# HINTS, QUERIES, AND COMMENTS.

To the Editor of the Dental Cosmos:

*Sir*,—In the May number of the Dental Cosmos two and one-half pages are given in the department of "Hints, Queries, and Comments," to what the writer claims to be a "novel method of filling teeth." The doctor is to be commended for the cleverness with which he describes his technique, but in presenting it as novel or new he will find many dentists all over the country who have been using cement and chloro-percha substantially in the same way for many years, and who, myself among the number, would submit a mild protest as to its novelty.

The use of cement and chloro-percha is good practice in a large majority of cases mainly because they hermetically seal the exposed dentinal tubules, and secondly because they present a septum modifying the thermal shocks conveyed through metallic stoppings. Most amalgams shrink or contract on hardening, the larger the filling the greater the shrinkage, in obedience to a natural law of crystallization,—and that the cement would overcome this is not tenable in practice or theory, nor would all the "King's horses" prevent it from shrinking, to say nothing of cement doing it.

My other comment on the method is that in forcing the soft cement out—or most of it—with large pellets of gold, presumably "soft" foil, filling the remainder of the cavity in the ordinary way with cohesive gold and mallet, leaves the most vulnerable location in the operation,—the cervical border,—the least perfectly done, and the slight but unavoidable quantity of cement at the margins of the bottom would soon disintegrate in a mouth where the secretions were predominantly alkaline, leaving a coign of vantage for the thrifty microbe to start business near the old stand again.

I do not present this brief comment in a spirit of criticism on Dr. Lowry's well-written hint on a valuable feature in the method of saving teeth, for though it may not be new to many, it is well worth the telling, and any man with a fund of experience who will come out of his shell and give a little time and thought for the benefit of his co-laborers deserves their gratitude.

D. W. Clancey, M.D.

Cincinnati, May 23, 1898.

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# LIST OF UNITED STATES PATENTS

## PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING MAY, 1898.

*May 3.*—No. 603,280, to Frank G. McCollum. Cuspidor for dental chairs.
" " No. 603,524, to James J. Coachman. Electric dental engine controller.
" *10.*—No. 603,731, to Chas. Millington. Tooth-powder box.
" " No. 603,803, to Louis L. White. Dental impression-material.
" *17.*—No. 604,218, to Albert Rosenberg. Spittoon.
" " No. 604,355, to James E. Keefe. Dental disk-mandrel.
" *24.*—No. 604,363, to Francis N. Brown. Artificial tooth for crown- and bridge-work.
" " No. 604 692, to Theo. N. Clark. Fountain spittoon.
" *31.*—No. 604,836, to Arthur J. McDonald. Dental engine.
" " No. 604,837, to Arthur J. McDonald. Dental engine.
" " No. 604,890, to William M. Seeger. Rubber-dam holder.
" " No. 28,739, to Jas. W. Ivory. Design for handle for punches.

# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

**Deutsche** Zahnärztliche Wochenschrift. Organ des Vereinbundes Deutscher Zahnärzte. No. 1, v. i, April, 1898.

**Smith** (Ernest A.) A manual of dental metallurgy. Lond., 1898, J. & A. Churchill, 295 p. 8°.

**Transactions** of the American Dental Association at the thirty-seventh annual session held at Old Point Comfort, Va., commencing on the 3d of August, 1897. Also appendix containing minutes of the convention and first meeting of the National Dental Association. Phila., 1898, S. S. White Dental Manufacturing Co., 292 p. 8°.

**Transactions** (Official report of the) of the Southern Dental Association, held at Old Point Comfort, Va., August 3, 4, 5, 6, 1897. Twenty-eighth annual meeting. Also minutes of the organization and transactions of the National Dental Association. Phila., 1898, S. S. White Dental Manufacturing Co., 155 p. 8°.

**Ungarische** Zahnärztliche Revue. Officielles organ des ungarischen stomatologischen (zahnärztlichen) Landsvereins. Nos. 1–4, v, 2, 1897.

---

**Abbamondi** (L.) Contributo alla casuistica della cura delle fistole salivari con pennellazioni di cocaina. Ann. di med. nav., Roma, 1898, iv, 255–259.—**Acker** (F.) Erosion. Ohio Dent. J., Toledo, 1898, xviii, 232–236.—**Anwendung** (Ueber die) von Chloroform in der zahnärztlichen Praxis. Cor.-Bl. f. Zahnärzte, Berl., 1898, xxvii, 163–165.—**Arendt** (P.) Weitere Beitrage uber regionäre Cocainänasthesie. Centralbl. f. Chir., Leipz., 1898, xxv, 401–403.—**Bar** (L.) Inflammations de l'amygdale linguale. Rev. internat. de rhinol., otol. et laryngol., Par., 1898, viii, 347–360.—**Barth.** Een en ander over de tonsilla pharyngea (adenoide vegetaties). Geneesk. Courant, Tiel, 1898, lii, no. 8.—**Beck** (A.) Zur innervation der Speicheldrüsen. Centralbl. f. Physiol., Leipz. u. Wien, 1898, xii, 33–37.—**Beck** (C. S.) Is dental caries accompanied by inflammatory action. Dental Cosmos, Phila., 1898, xl, 351–355.—**Beers** (W. G.) Diagnostic errors. Dental Digest, Chicago, 1898, iv, 225–230. ——— *Also:* Ohio Dent. J., Toledo, 1898, xviii, 212–217.—**Bertin** (J.) Die elektro-medicamentöse Behandlung in der Zahnheilkunde. Sitzungsb. d. phys.-med. Gesellsch. zu Wurzb., 1897, 57–64.—**Bezancon** (F.) **et V. Griffon.** Présence constante du pneumo-coque à la surface de l'amygdale. Gaz. d. hôp., Par., 1898, lxxi, 414.—**Black** (G. V.) Instrument nomenclature with reference to instrumentation. Internat. Dent. J., Phila., 1898, xix, 279–299.—**Bönnecken** (H.) On new methods of treating diseased pulps. Dental Rec., Lond., 1898, xviii, 158–171.—**Bonwill** (W. G. A.) Cataphoresis vs. the direct application of the galvanic current for obtunding sensitive dentine and how to exclude both. J. Am. M. Ass., Chicago, 1898, xxx, 1168–1170.—**Bradburn.** Cleft palate. Brit. J. Dent. Sc., Lond., 1898, xl, 385–398.—**Brodtbeck** (A.) Athyl-Chlorid als Inhalations-anästheticum. Schweizerische Vrtljschr. f. Zahnheilk., 1898, viii, 109–114.—**Broomell** (I. N.) Macroscopic tooth-development. Tr. Am. Dent. Ass., 1897, Phila., 1898, xxxvii, 123–153.—**Brophy** (T. W.) A case of antral disease involving the frontal sinus. *Ibid:* 194–196.—**Brown** (G. V. I.) Hyperkinesis of the muscles of mastication a symptom and an etiologic factor in nervous affections. J. Am. M. Ass., Chicago, 1898, xxx, 1162–1164.—**Brown** (R. H.) Parotitis from obstruction of Stensen's duct. Lancet, Lond., 1898, i, 1053.—**Capon** (W. A.) Practical points on porcelain fillings. Dental Brief, Phila., 1897–8, ii, 578–580.—**Carpenter** (G. T.) Hare lip, a case in practice. J. Am. M. Ass., Chicago, 1898, xxx, 1032. —**Case** (C. S.) Principles of force and anchorage in the movement of teeth. Tr. Am. Dent. Ass., 1897, Phila., 1898, xxxvii, 89–120.—**Cassidy** (J. S.) Relations of chemistry to dentistry. *Ibid:* 76–88.—**Chappel** (H. G.) Trigeminal neuralgia. Pacific Medico-Dental Gaz., 1898, vi, 173–182.—**Chappel** (J. A.) Dental education from a college standpoint. Dental Cosmos, Phila., 1898, xl, 337–344. —**Chauveau.** Hypertrophie exceptionnellement volumineuse de l'amygdale linguale. France méd., Par., 1898, xlv, 258.—**Clayton** (J. R.) Non-cohesive gold, tin, and tin-gold. Indiana Dent. J., Indianap., 1898, i, 409–417.—**Colyer** (J. F.) Formaldehyde in the treatment of pulps. Brit. J. Dent Sc., Lond., 1898, xli, 337–341.—**Common** (R. K.) Ein Fall von Durchbruch des mittleren Schneidezahnes in der Nase. Cor.-Bl. f. Zahnärzte, Berl., 1898, xxvii, 166.—**Copeland** (R. S.) The kinship of the ophthalmologist, the otologist and the dentist. Dental J., Ann Arbor, 1898, vii, 81-89.—**Coulliaux** (L.) Pulpitis chronica. Cor.-Bl. f. Zahnärzte, Berl., 1898, xxvii, 130-154.—**Crawford** (J. M.) Tonsillotomy; when and how to make it. J. Am. M. Ass., Chicago, 1898, xxx, 1113.—**Cunningham** (G.) The mechanical training of dental pupils. Brit. J. Dent. Sc., Lond., 1898, xl, 398-400.—**Curtis** (G. L.) Another case of reproduction of alveolar tissue. Ohio Dent. J., Toledo, 1898, xviii, 209-211.—**Damain.** Gingivostomatite mercurielle grave. Rev. odont., Par., 1898, xvii, 108-111.—**Denigès** (G.) Analyse complète d'une salive dans un cas de sialorrhée. J. de Pharm. v. Elsass-Lothringen, Strassb., 1898, xxv, 88-90.—**Dental** law of New Jersey. Dental Cosmos, Phila., 1898, xl, 408-412.—**Didsbury.** Hypertrophie chronique de l'amygdale linguale avec troubles réflexes. Bull. d. soc. méd. . . . . du dép. de la Seine, Par., 1898, i, no. 3, 10-14.—**Dolomore** (W. H.) Ueber Immediat-Torsion der Zähne nebst Berichten über einige Fälle. Cor.-Bl. f. Zahnärzte, Berl., 1898, xxvii, 154-162.—**Douglas** (A.) Empyema of the antrum in a child three weeks old. Australas. M. Gaz., Sydney, 1897, xvi, 595.—**Ducournau.** Des dents temporaires et des dents de six ans. Conséquences facheuses du manque de soins. Leur traitement. Odontologie, Par., 1898, 2. s., vi, 306-313.—**Dunn** (W.) An artificial piece for an ear. Internat. Dent. J., Phila., 1898, xix, 277.—**Eschelman** (A. S.) Formalin. Dental Cosmos, Phila., 1898, xl, 344-347.—**Fäsch** (T.) Airol und seine Anwendung in der Zahnheilkunde. Schweizerische Vrtljschr. f. Zahnheilk., 1898, viii, 121-126.—**Fantino** (G.) Contributo allo studio dell'actinomicosi umana. Riforma med., Napoli, 1898, xiv, pt. 2, 170; 181; 193.—**Ferguson** (A. H.) Esophagotomy for the removal of a plate of teeth after performing a thyroidectomy. Am. J. Surg. & Gynec., St. Louis, 1897-8, x, 161.—**Fillebrown** (T.) Continued study of the relations of the frontal sinus to the antrum. Tr. Am. Dent. Ass., 1897, Phila., 1898, xxxvii, 197.—**Fischl** (A.) Ein Fall von Verschlucken eines Zahnersatzstückes. Med.-chir. Centralbl., Wien, 1898, xxxiii, 210. —**Fletcher** (F. F.) Prophylaxis in bridge work. Dental Rev., Chicago, 1898, xii, 370-372.—**Foulis** (J.) Mechanical impediment to respiration during anæsthesia. Brit. M. J., Lond., 1898, i, 1065.—**Fox** (W. H.) Crystal gold. Dental Rev., Chicago, 1898, xii, 351-356.—**Foy** (G.) Excision of the tongue. Tr. South. Surg. & Gynec. Ass., 1897, Phila., 1898, x, 249-256.—**Freeman** (J. A.) Die Entfernung von Zahnstein-Ansatz. Cor.-Bl. f. Zahnärzte, Berl., 1898, xxvii, 119-124. —**Galloway** (D. H.) The administration of anesthetics. J. Am. M. Ass., Chicago, 1898, xxx, 1141-1145.—**Gardner** (H. B.) The use of nitrous oxide gas and oxygen during surgical operations. Brit. M. J., Lond., 1898, i, 1113.—**Gibson** (C. L.) Cancer of the lip. Tr. N. York Odont. Soc., Phila., 1897, 98-110.—**Gires** (P.) Hypodermic local anesthesia as practiced in Europe. Dental Cosmos, Phila., 1898, xl, 347-351.—**Godart-Danhieux.** Le rôle du ferment salivaire dans la digestion. Ann. Soc. roy. d. sc. méd. et nat. de Brux., 1898, vii, 1-132.—**Grady** (R.) Dental faculties in medical schools. J. Am. M. Ass., Chicago, 1898, xxx, 1167.—**Groák** (E.) Sarcoma veli palatini esete. Orvosi hetil., Budapest, 1898, xlii, 196.—**Guelliot.** Tumeurs de la parotide. Bull. Soc. méd. de Reims, 1898, n. s., iv, 250-252.—**Gysi** (A.) Uber einen Fall beginnender Resorption eines retinirten Zahnes. Schweizerische Vrtljschr. f. Zahnheilk., 1898, viii, 107-109.—**Hafner** (A.) Prophylaxis der Karies der Sechsjahrmolaren. *Ibid:* 114-117.—**Harlan** (A. W.) Pyorrhea alveolaris. Cor.-Bl. f. Zahnärzte, Berl., 1898. xxvii, 167-172.—**Hartman** (S. B.) Antiseptics and germicides. Indiana Dent. J., Indianap., 1898, i, 430-433.—**Haury.** Néoplasie labiale de nature indéterminée. Bull. Soc. franç. de dermat. et syph., Par., 1898, ix, 162.—**Heckard** (W. A.) The Logan crown band. Indiana Dent. J., Indianap., 1898, i, 407-409.—**Helme** (F.) La sinusite maxillaire du roi Louis XIV. Chron. méd., Par., 1898, v, 273-284.—**Henshaw** (F. R.) Square-seated fillings. Indiana Dent. J., Indianap., 1898, i, 418-422.—**Hilliard** (H.) A method of prolonging nitrous oxide anaesthesia in dental practice. Lancet, Lond., 1898, i, 1244-1244. ——— *Also:* Dental Rec., Lond., 1898, xviii, 145-151.—**Ingals** (E. F.) Specific pharyngitis. Internat. Clin., Phila., 1898, 8. s., i, 177.—**Jaboulay** (M.) **et L. Bérard.** Traitement chirurgical du prognathisme inférieur. Presse méd., Par., 1898, i, 173-176.—**Jeffery** (L.) Ein Fall von Vorstehen der oberen Schneidezähne und dessen Regulirung vermittelst des Angle'schen Apparats. Cor.-Bl. f. Zahnärzte., Berl., 1898, xxvii, 116-118, 1 pl.—**Johnson** (C. N.) The protection and maintenance of the gum tissue in the interproximal space. Dental Rev., Chicago, 1898, xii, 347-351.—**Kirstein** (A.) Ein Nageltroicart für die Oberkieferhöhle. Illustr. Monatschr. d. ärztl. Polytech., Berl., 1898, xx, 75.—**Kleinmann** (F.) Die Beutelrock'schen Nervenkanal-Instrumente. Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 205-209.—**Lake.** The question of priority of claim to that operation on the antrum of Highmore combining temporary opening through the canine fossa and also a counter opening in the interior meatus. J. Laryngol., Lond., 1898, xiii, 177.—**Liaras** (G.) La bouche chez les souffleurs de verre. Rev. hebd. de laryngol. [etc.], Par., 1898, xviii, 417-427, 1 pl.—**Lichtwitz.** Un cas de sarcome pédiculé de la langue; ablation avec l'anse électrothermique; guérison. Gaz. hebd. d. sc. méd. de Bordeaux, 1898, xix, 199.—**Lincoln** (R. P.) Oropharyngeal mycosis. Med. News, N. Y., 1898, lxxii, 556-559.—**Löffler.** Sur la fievre aphteuse. Presse méd., Par., 1898, i, 204.—**Long** (A. M.) Nitrous oxid. Ohio Dent. J., Toledo, 1898, xviii, 217-220.—**Lord** (B.) Method of using soft foil. Internat. Dent. J., Phila., 1898, xix, 265-270.—**McCaw** (J. F.) Adenoid vegetations of the pharynx. N. York M. J., 1898, lxvii, 604-607.—**McCrae** (T.) Glossitis in typhoid fever, with report of a case. Johns Hopkins Hosp. Bull., Balt., 1898, ix, 118.—**McGovern** (E. E.) Dental ethics. Dental Digest, Chicago, 1898, iv, 233-237. ——— *Also:* Ohio Dent. J., Toledo, 1898, xviii, 220-224.—**Maillart** (A.) Beitrag zur Behandlung der Zahnfisteln. Schweizerische Vrtljschr. f. Zahnheilk., 1898, viii, 118-121.—**von Mathé** (L.) Ueber die Regulirung der Zähne. Pest. med.-chir. Presse, Budapest, 1898, xxxiv, 385-390. ——— *Also:* Gyógyászat, Budapest, 1898, xxxviii, 218-220.—**Miller** (A. G.) Ueber de Aetiologie und Behandlung der Anschwellungen der Halsdrüsen. Cor.-Bl. f. Zahnärzte, Berl., 1898, xxvii, 124-130.—**Mongie.** Epulis dégénéré en sarcome. J. de méd. de Bordeaux, 1898, xxviii, 176.—**Murto** (F. D.) The use of coagulants in the treatment of pulpless teeth. Ohio Dent. J., Toledo, 1898, xviii, 228-232.—**Nones** (R. H.) The preparation of the mouth for an artificial denture preparatory to taking an impression. Internat Dent. J., Phila., 1898, xix, 270-277.—**North** (G.) Mouth-breathing; cause and effect. Items Interest, N. Y., 1898, xx, 375.—**Paterson** (D. R.) The supratonsillar fossa and its affections. J. Laryngol., Lond., 1898, xiii, 165-177.—**Peck** (A. H.) Formaldehyde; its antiseptic and irritating properties. Dental Rec., Chicago, 1898, xii, 356-362.—**Pfeifer** (Josephine D.) Alveolar abscess. Dental Rev., Chicago, 1898, xii, 363-370.—**Plüder** (F.) Ueber die Bedeutung der Mandeln im Organismus. Monatschr. f. Ohrenh., Berl., 1898, xxxii, 164-177.—**Port** Kieferbruchschienen aus Zinn. Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 201-205.—**Price** (W. A.) The foundation principles of dental cataphoresis. Items Interest, N. Y., 1898, xx, 345-374. ——— The phenomena of cataphoresis. Tr. Am. Dent. Ass., 1897, Phila., 1898, xxxvii, 50-75.—**Quéré.** Iniezioni nella gengiva a scopo di estrarre i denti senza dolore. Gior. di corrisp. p. dentisti, Milano, 1898, xxvii, 37-39.—**Rasch.** Trigeminusneuralgie traumatischen Ursprungs. Centralbl. f. Nervenh. u. Psychiat., Coblenz u. Leipz., 1898, n. F., ix, 196-200.—**Rosenthal jr.** Blutungen nach Zahnextraktionen. Zahnärztl. Wchnbl., Hamb., 1898, xi, 317; 325; 333.—**Rosenthal** (E.) Névralgies d'origine dentaire. Rev. odont., Par., 1898, xvii, 163-170.—**Root** (C. B.) Immunity from syphilis. Pacific Medico-Dental Gaz., 1898, vi, 183-186.—**Roy** (D.) Peritonsillar abscess. J. Am. M. Ass., Chicago, 1898, xxx, 1112.—**Roy** (M.) Gomme syphilitique du maxillaire supérieur. Odontologie, Par., 1898, 2. s., vi, 225-234.—**Ruegg** (C.) Ueber Continuous gum-Technik und das Bemalen künstlicher Zähne mit Porzellanfarben. Schweizerische Vrtljschr. f. Zahnheilk., 1898, viii, 126-135, 1 pl.—**Sarrazin** (J. J.) Matrix contouring. Dental Cosmos, Phila., 1898, xl, 355-358.—**Schirmer** (A.) Ueber einen Fall von Soormykose beim Gesunden. Med. Rundschau, Berl., 1897-8, 231-233.—**Schlichting** (H.) Klinische Studien über die Geschmackslähmungen durch Zerstörung der Chorda tympani und des Plexus tympanicus. Ztschr. f. Ohrenh., Wiesb., 1898, xxxii, 388-401.—**Schmidt** (L.) Zur Casuistik der Störungen, die durch Retention von Weisheitszähnen hervorgerufen werden. Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 209-212.—**Schreiber** (M.) Geschichte der operativen Kieferklemmentherapie. Cor.-Bl. f. Zahnärzte, Berl., 1898; xxvii, 100-105. ——— *Also, transl:* Gior. di corrisp. p. dentisti, Milano, 1898 xxvii, 7-14.—**Seelhorst** (G.) Behandlung der Unterkieferbrüche durch Gewichtsextension. München. med. Wchnschr., 1898, xlv, 526.—**Sharp** (A. J.) Notes of a case of xerostomia (mouth-dryness). Lancet, Lond., 1898, i, 1114.—**Siffre.** Complications de la gingivite ulcéreuse chez des enfants; perte de dents temporaires en formation. Rev. odont., Par., 1898, xvii, 112-117.—**Stellwagen** (T. C.) Dentistry or stomatology. Tr. N. York Odont. Soc., Phila., 1897, 145-158.—**Sullivan** (G. A.) Obscure dental irritations as a cause of facial neuralgia. Albany M. Ann., 1898, xix, 262-265.—**Talbot** (E. S.) Pyorrhea alveolaris in mercurial and lead poisoning and scurvy. J. Am. M. Ass., Chicago, 1898, xxx, 1026-1028.—**Thévenin.** Trois cas de glossolabialite tertiaire. J. d. mal. cutan. et syph., Par., 1898, x, 160-163.—**Thurston** (E. O.) A case of an artificial denture impacted in the pharynx. J. Brit. Dent. Ass., Lond., 1898, xix, 222.—**Waggett** (E. B.) Radical cure of long-standing antral empyema. J. Laryngol., Lond., 1898, xiii, 181.—**Walker** (W. E.) The facial line and angles in prosthetic dentistry. Tr. South. Dent. Ass., 1897, Phila., 1898, xxviii, 16-38.—**Walkhoff** (O.) Aufnahme der Gesichtsknochen mit Röntgenstrahlen. Cor.-Bl. f. Zahnärzte, Berl., 1898, xxvii, 97-99, 2 pl.—**Waller** (A.) Dosage in anæsthetics. Clin. J., Lond., 1897-8, xi, 426-430. [Discussion], 450-456.—**Wallis** (C. J. B.) Formalin. Brit. J. Dent. Sc., Lond., 1898, xli, 341-344.—**Ward** (C. H.) Human teeth from a comparative standpoint. Tr. Am. Dent. Ass., 1897. Phila., 1898, xxxvii, 199-238.—**Weisse** (F. D.) Fractures of the maxillæ. Tr. N. York Odont. Soc., Phila., 1897, 125-138.—**Williams** (J. L.) A contribution to the study of pathology of enamel. *Ibid:* 2-96. ——— Nerve and blood supply of the dental pulp. Items Interest, N. Y., 1898, xx, 339-342. ——— The dentinal fibrils. *Ibid:* 342-344.—**Wölfler.** Demonstration eines Falles von Resection eines Ganglion Gasseri. Prag. med. Wchnschr., 1898, xxiii, 178.—**Znamensky** (N. N.) Ueber die Entstehung der keilförmigen Defecte (erosion) der Zähne. Cor.-Bl. f. Zahnärzte, Berl., 1898, xxvii, 105-116.

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# ORIGINAL COMMUNICATIONS.

## THE ARCHITECTURE OF THE HUMAN TEETH.

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ABOUT one year ago I contributed to the DENTAL COSMOS an essay, entitled "Molding Tooth-Forms," which had for its object the exposition of a novel method of demonstrating the modifications of basal cones contained in tooth-forms; next, as a contribution to the dental students' study of dental anatomy, and, finally, the use of a material which should materialize these ideas, make them comprehensible to students with a minimum expenditure of time. It was designed that the material of the essay be utilized by the National School of Dental Technics, to construct a uniform and satisfactory method of teaching dental anatomy.

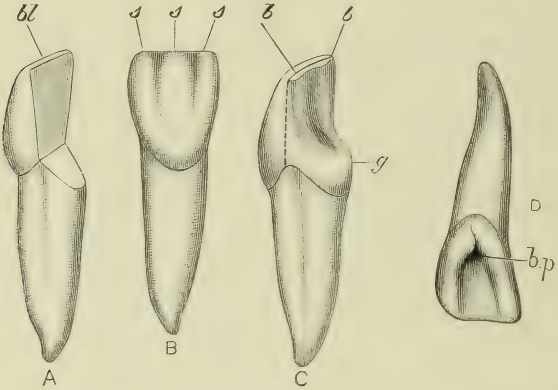
Some features of the architectural designs of the human teeth were briefly mentioned, but not emphasized. Indeed, the significance of some of the data presented did not reveal themselves to the writer at the time, but subsequent examination gives them an increased importance; some of the phrases and terms employed in the essay have a better foundation in fact than then thought of.

The terms, buttresses, stanchions, girders, applied in description of enamel masses of the several groups of teeth, describe the mechanical and architectural arrangements with sufficient accuracy to warrant considering whether these terms should not have a place in dental nomenclature.

For example, taking a typical upper central incisor, its outer labial face is marked by two longitudinal depressions, which cause upon either side of the depressions longitudinal ridges to appear, one median, two lateral, these latter forming the mesial and distal edges of the tooth; an examination will show these ridges or elevations to be perpendicular supports to the cutting blades of the teeth, —that is, they act as *stanchions*. Fig. 1 (B, *s*, *s*, *s*).

Examining the palatal or lingual surface of the tooth, a general concavity is seen, bounded upon mesial and distal sides by two ridges of enamel which begin at the mesial and distal angles of the occlusal edge of the tooth, descend increasing in thickness, and merge together at the neck of the tooth. Fig. 1 (C, *b*, *b*). The form and character of these masses may be clearly seen by studying the functional design of an incisor. This is primarily a cutting blade, Fig. 1 (A, *bl*), resting upon the outer segment of the root (fused with it of course). The tendency to fracture of such a blade unsupported would be great; this tendency is best resisted by girding the blade fast to the root, the mechanical support being so arranged that an increased thickness at the edges alone does not destroy the efficacy of the cutting blade. There is no doubt as to what term should be applied to the girdle-like mass into which these lateral supports fuse; it is truly an enamel girder. The choice of terms for the lateral braces lies between buttress and girder. The objection to the first term is that buttresses are structures designed to brace against thrust applied from an opposite side; the objection to girder is that the supports are too nearly perpendicular. The term buttress is perhaps preferable to prevent confusion, as the girder element is unmistakable in other situations; the buttress design being confined to the anterior, the sectorial teeth.

Fig. 1.



It may be said then that the architectural design of incisors is a cutting blade, its outer face reinforced by three stanchions, and which is supported against fracture by two lateral buttresses girded together at the neck of the tooth. While it is undoubtedly true that this design is unmistakable in typical cases, the several elements are not entirely evident in all teeth; in some, buttresses, girders, and stanchions are pronounced, at the other extreme these structures are simply fused into the general tooth form.

This buttress arrangement is more evident upon the lateral incisors than upon the centrals; in the former teeth it is frequently observed that the union of the buttresses is faulty and a fissure exists in the cervical girder. Fig. 1 (D, *bp*). In these same cases the junction of the girder with the cutting blade is also faulty, forming the defect known as a basilar pit. This defect is more frequently formed by the union of right and left buttresses being marked by a tubercle-like elevation which causes a depression between girder and blade.

The human cuspid, Fig. 2, A, B, C, as its name implies, is pointed, yet, except in rare cases, is not a true canine tooth; this name if applied to designate position is quite correct, but it does not describe the function of the tooth in the human denture.

A true canine as found in the carnivora is a conical tooth projecting far beyond its neighbors, and firmly interlocking with its antagonists. In the act of occlusion these teeth by their meeting hold the jaws in firm guides so that tnere is no lateral movement. This function of guides and braces is, as pointed out by Bonwill, of perhaps equal importance with that of seizing and holding which this dental arrangement is fitted for.

In the human denture, not only are the cuspid teeth too short to subserve the offices named, but the character of occlusion is different, hence they are not true canines, although they are cuspid teeth. It is not suggested that the phrase canine be abandoned, as there is perhaps no other word which would serve so well in comparative anatomy; but in any other sense than indicative of position alone it is a misnomer when used in connection with the human denture.

An examination of a typical tooth of this series will show it to be composed of two beveled cutting blades (*bl*, Fig. 2, A) so arranged that the junction of the blades forms a projecting point, which gives name to the tooth. The architectural and mechanical provision for support of these blades is found upon both external and internal surfaces as upon the incisors. It has the lateral stanchions; the median stanchion is continued as a prominent column to the point of the tooth. (Fig. 2, B, *s*, *s*, *s*.) At the lingual aspect the lateral buttresses are more marked and massive than upon the incisors. A median buttress descends from the point of the tooth, merging with the lateral buttresses to form a heavy girder at and above the neck of the tooth (Fig. 2, C, *b*, *b*, *b*, the buttresses, *g* the girder).

In the essay referred to in the early part of this paper, it was stated that the bicuspid (premolar) and molar teeth were all multiplications of a basal cuspid form, being formed by the fusion of two or more cuspids. So far as forms are concerned this is exactly true.

Taking for example an upper bicuspid, all of the structural elements of cuspid teeth are present except the cervical girdles. (Fig. 3.) It consists of two segments as A, or cut away at the lingual aspect. The line of junction of the two segments is the median fissure of the bicuspid tooth. These segments are bound together, protected against lateral stress by two girders (*g*, *g*, Fig. 3, B); the line of junction of these girders with the cuspid segments forms the )( shaped sulci or fissures of these teeth. An examination of a typical tooth will show the presence of the cuspid buttresses (same figure, *b*, *b*). The stanchions are present on the outer segment of the tooth, but except in very rare instances are obliterated from the inner or lingual segment.

In some specimens of these teeth the cusps are unusually long. Great cusp length is usually associated with a broad occlusal face and bifurcation of the root, and increased definition of buttresses and sulci; specimens having short cusps usually have an opposite type of structure. The reason for this is evident,—in some cases the reduction of the lingual portion of the basal cuspid is but little; this means that the points of the cuspid segments will be farther separated, hence the occlusal surfaces are broader. It follows also that the deeper the cusps the shorter will be the median sulcus, and the longer the lateral sulci. The girders (*g*, B and C) are triangular pyramids in form, their apices toward the necks of the teeth.

FIG. 2.

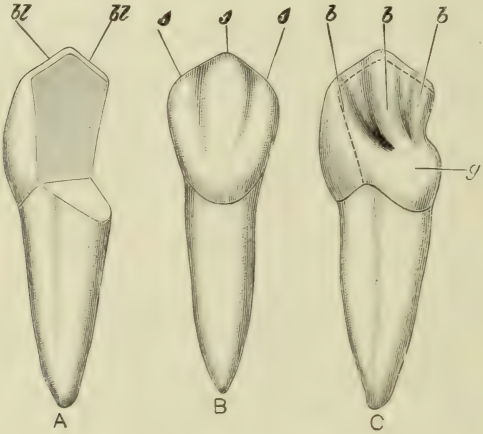
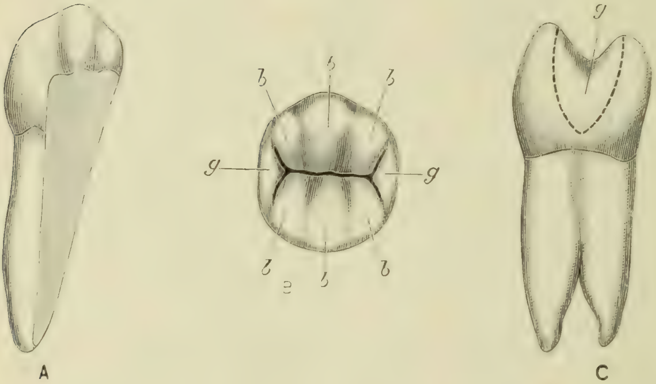


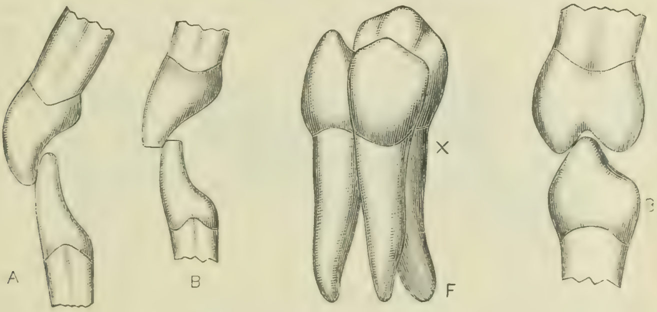
FIG. 3.



As a mechanical principle it may be asserted that the longer the cusps the greater importance is an integrity of these girders, as the lateral stress tending to separate the cuspid segments—*i.e.*, fracture the tooth—is in the ratio of the cusp length. In all of the upper teeth, from the median line to the end of the dental series, there is another efficient architectural protection against fracture, and that is the general rotundity of the outer segments of the teeth. As a rule the greater the lateral stress upon the teeth,—*i.e.*, the greater the overbite,—the more convex are these surfaces. (Fig. 4, A and B.) This convexity is particularly marked on the lateral incisor. This peculiarity, usually described as a bending inward of the crown of the tooth, brings the line of stress upon any particular tooth in toward the axis of the tooth. This fact has an important clinical bearing in the contouring of teeth, the shaping of artificial crowns, and in diseases of the pericementum and their treatment.

The tricuspid arrangement of the upper molars is unmistakable only in the third member of the series. In all of the molars, upper and lower, the axes of the cuspid segments are at an angle with one another, all of the axes converging toward the centers of the crowns. In the bicuspids there is an axis common to both inner and outer segments. Taking first the third molar, it is seen to be composed of three cuspid elements arranged as shown in Fig. 4, F, which are also found in the other upper molars. The palatal segment is much larger than either of the buccal, the anterior being larger than the posterior buccal segment. The junction of the segments (A, Fig. 5) marks the long longitudinal and single bucco-occlusal sulci. These segments are bound together by an anterior and a posterior girder, their junctions forming the radiate sulci usually present upon this tooth. The anterior girder is the larger and stronger. When the posterior girder is large, this tooth resembles that anterior to it, the second molar.

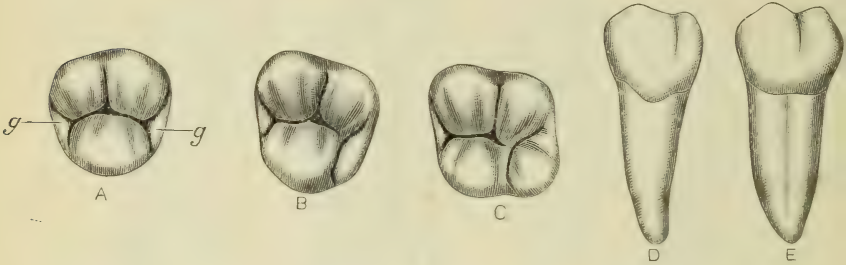
FIG. 4.



The lingual cuspid segment is smaller in the first and second molars than in the third, and is pressed forward so that a linguo-mesial angle is formed. This shifting of segment is accompanied by a slight change in the position of the median sulcus. In both first and second molars the distal girder binding the lingual and disto-buccal segments together is persistent. The fourth cusp of these teeth is formed by the addition of a pyramidal mass disto-lingually. The line of junction of this supplemental mass with the basal tricuspid arrangement is marked by a characteristic sulcus. In the second molar this supplemental mass is clearly an addition to the crown alone (Fig. 5, B and D), the palatal root being unmistakably a single cone.

In the first molar, and occasionally in the second, the fourth cusp is a distinct cuspid segment (Fig. 5, C and E); in these cases evidences of incipient bifurcation of the palatal root are observable. In both first and second molars the distal buttresses of the lingual and disto-buccal segments form a continuous ridge or bridge characteristic of these teeth, the disto-lingual fissure being at its base posteriorly. While it is undoubtedly true that cuspules and tubercles appear upon the crowns of the teeth without any corresponding change in root-forms, the appearance of large masses to crowns is frequently if not usually accompanied by evidence of modification of root-forms; the grooving of roots being pronounced in the ratio of the size of the addition to the crown.

Fig. 5.

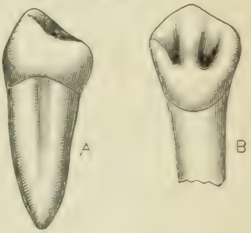


Reverting to the postulate that the cuspid teeth of man are a double cutting blade, a study of "wear" marks upon bicuspids and molars will show how all of these blades, four on bicuspids, six to eight on molars, are brought into functional use in mastication.

The design of lower incisors is a slight modification of that of the upper, stanchions and girders being less marked. In all of the lower teeth the brunt of work is borne by their outer segments. In all of the upper teeth the axis of stress is inward (lingually) of the outer edges; in all of the lower teeth the axis of stress passes through axes of the buccal cusp segments. The crowns of all of these teeth are bent inward (lingually), so that the line of stress upon the buccal edges of the teeth passes through the longitudinal axes of the roots.

This crown bending is not particularly evident unless extracted teeth are studied. The posterior lower teeth as seen in the mouth or on plaster casts appear to be set at an angle with the horizontal; this arrangement is, however, only true so far as the crowns are concerned; the roots occupy vertical positions. As a rule a perpendicular line passing through the buccal cusp points will pass through the apex of the root. (Fig. 6, A.) A study of the lower premolars of man will show that they are not true bicuspids. The first premolar is a modified cuspid in which the lingual girder is elevated into a primitive cusp (Fig. 6, B); the median buttress of the cuspid element is much exaggerated, forming a ridge. The lower molar teeth are formed of multiplications of this basal design.

FIG. 6.



The lower second premolar is a tricuspid tooth, in which the buccal segment is most pronounced. At least three distinct types of this tooth are found. (Fig. 7, A, B, C.)

In one (A) there is a distinct bicuspid arrangement between a buccal and a lingual segment; the median buttresses are prominent as in the first premolar; a disto-lingual cuspid segment is added and girded to the preceding arrangement, forming a tricuspid tooth. In B the three cuspid elements, one large buccal, two small lingual, may be clearly made out. In the third type the buccal segment so overshadows the lingual segments that the latter are reduced to but edges. The preponderance of one segment over others determines the variations of sulci arrangement so frequently observable in these teeth.

FIG. 7.

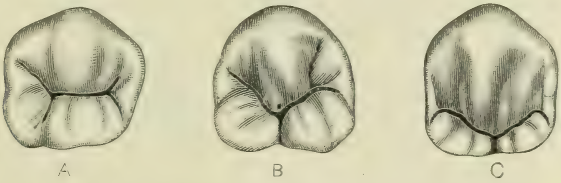
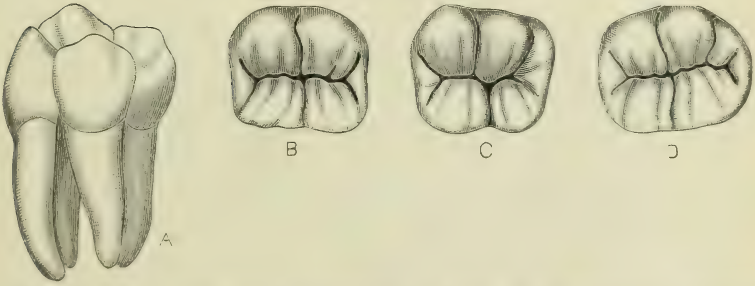


FIG. 8.



The lower molars are composed of four of the single elements represented in a lower first bicuspid. They differ from the upper in the increased prominence of the median buttress. The grouping of the cuspid elements is shown in Fig. 8, A. It will be observed that the fusion of the anterior cuspid segments with one another and the fusion of the posterior segments with one another produces the flattened anterior and posterior roots in which incipient bifurcation is plain. Viewed upon the occlusal aspect a rectangular surface is seen, the axis of each cuspid element pointing toward its center. These segments are bound together anteriorly and posteriorly by two girders similar to those found in the upper bicuspids (Fig. 8, B), the several lines of junction forming the characteristic sulci of these teeth. The sulcus arrangement is most clearly seen in these teeth, as the several lines frequently mark imperfect junctions,—*i.e.*, fissures. The second molar is the typical tooth of the lower molar series, as the third is the typical representative of the upper. The lower first and third molars are modifications of the design, each having a supplemental cusp. In the first molar (Fig. 8, C) this assumes in some specimens the importance of a distinct cuspid segment, smaller, however, than the other four. The addition of this mass alters the form of the occlusal surface, changing it from a rounded rectangle to a rounded trapezoid, and causes a distortion of the typical lower molar sulci.

This supplemental mass, usually present on the first molar, is frequently absent from the third; when present upon the latter tooth it is usually attached farther back, giving a convexity to the distal surface of the tooth and causing deflection of sulci (Fig. 8, D).

There are features of much anatomical and clinical interest in the architectural arrangement of the roots of teeth, which have been detailed elsewhere.*

The evidences are so abundant in the outline contour forms, arrangement and forms of sulci and enamel masses, that the study of tooth-forms after the manner set forth has a distinct interest and significance as to the ontogeny of the human teeth. That there is a distinct mechanical pressure element involved in the production of tooth-forms appears to be evident; and is more evident from a study of the variations as to the arrangement of the enamel masses of the teeth. In general terms this pressure element appears to operate most markedly upon the lingual segments of the teeth, both upper and lower, but is more marked in connection with the lower teeth.

It cannot be questioned that tooth-forms are all an evolution from primitive cones, being formed from cones, their modifications and multiplications. These basal cones, their modifications and duplications, are most evident in the outer (the labial and buccal) segments of all of the teeth; it being the lingual segments in which evidences of mechanical pressure modifying form are the rule. The distribution of masses and their lines of junction are of a nature to suggest the molding of plastic individual tooth-follicles, each of which has a basal anatomical design.

To make this clear, it is necessary to revert to the theory of the comparative anatomist that all tooth-forms are an evolution from primitive cones. The writer demonstrated (in essay quoted) what types and directions of pressure should be applied to produce incisor and cuspid elements, both of which could be formed from single cones. Accepting literally that bicuspids and molars are multiplications of primitive cuspid segments bound together, the reasons for their forms must of course be sought for in the developmental stages. That is, to produce a bicuspid a fusion of two cuspid follicles has occurred; to form an upper molar the fusion of three, and it may be four, follicles; in a lower molar the fusion of at least four follicles is to be sought. It is not questioned, indeed the contrary is demonstrable, that the follicles and enamel-organs of molars and bicuspids assume their typical forms in the human jaw as single organs; the present inquiry is directed toward a possible ontogeny of those forms.

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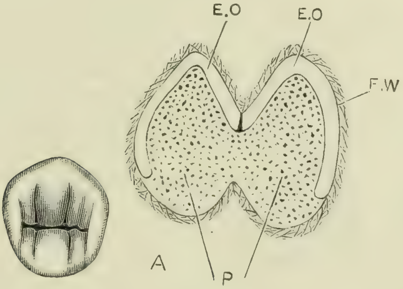
*Text-Book, "Dental Pathology and Therapeutics," Burchard. Lea Bros., 1898.

Taking for example an upper bicuspid, and assuming that it was originally derived from two cuspid elements,—*i.e.*, the fusion of two cuspid follicles,—the disposition of parts would be as represented in the section (Fig. 9). The two enamel-organs at their line of junction represent the median sulcus of a bicuspid; if this section were magnified and the details of its cellular anatomy inserted, it would furnish an explanation of why amelification is frequently faulty along this line,—*i.e.*, why a fissure is common. Viewed from above, it would be shown that the enamel girders are produced by the fusion of the lateral cuspid girders,—a condition explicable by pressure upon the approximal aspects of the follicles, a variety of pressure which would also serve to explain the flattening of the approximal surfaces of these teeth. It may be said, parenthetically, that these girders are in some cases crossed by a fissure, a line of imperfect union.

FIG. 9.



E.O, Enamel-organ; P, Papillæ; F.W, Follicular wall.

Indications of pressure upon plastic masses are seen in both first and second upper molars, notably in the lingual cusp, which is pressed forward in the degree of the size of the disto-lingual supplemental cusp. When, as shown in Fig. 5, C, this mass assumes the proportions of a cuspid segment, the main segment is found forward and the girder binding the primary cuspid segments is elevated into a prominent ridge and bent forward as shown by the direction of the sulcus.

The forms of all of the lower posterior teeth exhibit a fixedness of typical form as regards their outer or buccal segments, the pressure element affecting the lingual segments. While the buccal surfaces are boldly convex, the lingual surfaces of these teeth are all relatively flattened; they have the form of primitive cuspid elements pressed as plastic masses into apposition with comparatively fixed buccal segments. This is most notable in the case of the lower second bicuspid type C, Fig. 7, in which the buccal segment is almost complete, the lingual segments supplemental ridges retaining traces of a cuspid origin.

Doubt has always existed as to the origin of the forms of enamel-organs, whether there is an inherent tendency in these infoldings of epithelial tissue to assume typical forms or whether they assume typical forms by being molded over papillæ which are the true seat of form origin; assuming that in the evolution of the human jaw and denture we must begin investigations with a much elongated mandible armed with a great number of teeth,—at least forty-eight. There are at least thirty-six cones represented in the upper denture of man, and forty-four in the lower.

With a tendency to a shortening of jaws and a constant number of primitive conical teeth, the latter would be crowded together. In the formative period the single dentinal papillæ are pressed upon antero-posteriorly, and make fusions or unions a probability.

Assume now that such fusions occur, with a progressive shortening of the jaw, and that a rampart composed of a fewer number of teeth, though of the original number of basal cones, is produced. With a decreasing jaw length, the number of teeth constant, the papillæ and their epithelial coverings would be forced into new positions. During the formative period comparatively slight mechanical obstructions modify form and development. Now as the lingual aspect of upper and lower jaws represents mechanical rigidity as compared with the buccal aspects, pressure is assumed to be toward the buccal aspect, so that lingual cones would be pressed against the cones forming the buccal rampart. While it is to be understood that this explanation is purely hypothetical, it is in acccordance with the forms of the teeth. Examining the matter from the evolutionist's point of view, it would appear that changes in cusp arrangement preceded changes in the character of the temporo-maxillary articulation. Every anatomist has noted how changes in the mode of occlusion of the teeth are followed by anatomical changes in the articulation named. Whether the original shortening of the jaw was in consequence of a change of food habit or *vice versa*, it is evident that changes of cusp arrangement and occlusion necessitate changes of diet.

As to the question of whether the fusion of follicles is primarily one of papillæ or of enamel-organs, the former is the more satisfactory solution. (See Fig. 9.) In this illustration, showing the form of a bicuspid follicle, the enamel-organs are incomplete, the papillæ fused, as may be observed in the developing tooth, and the follicular walls remain partially distinct, because of the formation of multiple roots; did they fuse, but single roots could form.

This subject might be expanded to great length by filling in details as to variations of anatomical forms and a study of directions and types of pressure; but as the purpose of this essay is in the main but suggestive, teachers may readily fill in vacancies and make additions which will suggest themselves to any one who studies tooth-forms.

The architectural arrangement of the teeth *en masse* is of equal interest with their individual structure, as is also a study of the shapes, arrangement, and forms of tooth-roots; a detailed exposition of these subjects would, however, make a small treatise in itself.

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## CATAPHORESIS (ELECTROLYSIS).

BY W. V-B. AMES, CHICAGO, ILL.

It is gratifying to be able to record of this most interesting subject, that the work of a number of earnest investigators has placed it on a much more substantial and comprehensive foundation than it occupied a few years since, when a general interest was excited by the paper of Dr. Gillett. The underlying principles have been quite satisfactorily brought to light, and the apparatus for mastering the technical features has been not only improved, but its principles are better understood by the mass of practitioners. An important change brought about recently is the abandonment of the view that so-called cataphoresis is something vague, mysterious, occult, or what not, and the attributing of the results to definite and fairly well understood phenomena.

It is a remarkable coincidence that Humphry Davy discovered the phenomena of electrolytic decomposition in 1806, and Reuss, of Moscow, called attention in 1807 to the peculiar flow produced in liquids by the passage of a galvanic current; and that in all these years, after many scientific men have studied the latter phenomena and given to it distinctive names, it has remained for men of the immediate present practically to call attention to the dependency of one set of phenomena upon the other.

The first to call attention in dental literature to the probable dependency of so-called cataphoresis upon electrolytic decomposition was Professor Neiswanger, at the Ohio State Dental Society, December, 1896.

In a translation of Nernst's "Theoretical Chemistry," 1895, that author maintains that the flow ascribed by the older theories to some *peculiar* force *is* dependent on the movement of the ions in the electrolytic decomposition taking place. This work had probably not come to the notice of Professor Neiswanger, as he did not mention it.

From that time, as views have appeared in print, there has been a general flocking to this belief by the men who have had most to say on the subject, and I am inclined to believe that several have come to the belief from their individual contemplation of the phenomena, without any knowledge of the work of the above-mentioned German investigator. My own conviction, that there was no such thing as a distinct electrical phenomenon which ought to be called cataphoresis, was expressed in October, 1896, at the Northern Illinois Society. If I understand certain remarks credited to Drs. Gillett and Van Woert and others in their locality, they consider this to be the case.

Dr. W. J. Herdman, in the *Bulletin of the Electro-Therapeutical Laboratory of the University of Michigan*, January, 1897, says, in regard to the relation of "cataphoresis and anaphoresis" to electrolysis, this: "Since it has been found that the nature of a substance determines the direction it will travel in a solution, when that solution is made a part of the path of a direct current, strong evidence has been educed to prove that what we term cataphoresis and anaphoresis is nothing more or less than the migration of the ions in the process of electrolysis; the positively charged ions seeking the negative pole, and the negatively charged ions being attracted to the positive pole."

Dr. Weston A. Price, of Cleveland, takes extreme views in this direction. In a paper on "Phenomena of Cataphoresis," read before the American Dental Association, 1897, after giving the laws governing the phenomena of osmosis, he says, "These above observations hold good for practical application *if* the force we are dependent upon is osmosis. We can make our deductions as to this both from a clinical and theoretical standpoint. Will osmosis carry cocain into dentin to any considerable extent? To answer this, I have sealed a saturated solution of cocain into cavities for two days, and again for two months, without producing anesthesia except on the very surface of the cavity. I have also applied it for some time on an exposed pulp, and could not cut very far into it. Sulfate of strychnia and bichlorid of mercury applied on cotton to the chest of frogs produced no physiological effect, while with a current death was produced in a few minutes. This, at one stroke, seems to answer the question as to whether osmosis alone can produce this condition." In the same paper, after giving some clinical facts regarding cocain anesthesia, he says, "What deductions can we make from the above clinical results? And the foregoing laws of nerve excitability, the laws of osmosis, and the laws of electrolysis?

"We know that when a solution of cocain is supplied to the dentin of a tooth under the positive pole, with a negative elsewhere, we do get anesthesia, not only of the dentin, but of the pulp-tissue, if applied long enough.

"Will the current alone produce this condition? Answer, no.

"Then it is not the current that does the work.

"Will the medicine alone produce this condition? Answer, no.

"Then it is not a simple osmosis.

"Does the current so applied produce any change in the cocain solution? Answer, yes. It cannot pass through it except by changing it.

"Is there a transmission of matter in this solution under these conditions by simple osmosis? Answer, probably very slight.

"Is there a considerable transmission of matter at all? Answer, yes, by the migration of the ions.

"Do these ions produce currents which carry the unchanged medicine with them? Theoretically, yes, but practically, very slight.

"Do we know that a medicament can actually be forced into the pulp at all? Answer, yes, in many ways. I have put sulfate of morphin with the cocain, and, after extracting the pulp on a broach, been able to detect the morphin by the nitric acid test under the microscope. I have killed a frog in twenty minutes with sulfate of strychnin with the current, when neither the current alone nor the medicine alone, left for a considerable time, produced any noticeable effect.'

Dr. William J. Morton, after holding the opinion, in February, 1896, that cataphoric action is simply the driving power of electricity behind a fluid, and saying, "I do not believe that cataphoresis and electrolysis have any physical relation," says this year in his book, "Cataphoresis," this: "Some observers are inclined to credit all phenomena of cataphoric medication to electrolysis, and others claim that electrolysis has essentially nothing to do with these phenomena;" and continuing, "If I were to suggest a view it would be to the effect that the directive movement of fluids by electricity is a property of the current coincident with electrolysis, but that electrolysis is only useful in so far as it insures the existence of a current and *allows of** a propulsion of undissociated and electrically charged molecules constituting the medicament, along with it." If Dr. Morton had said *causes* a propulsion instead of *allows of* a propulsion, he would have been thoroughly consistent, as it seems to me, and would have been pretty near up in line with advanced opinions.

At the Illinois State Society, May, 1897, I stated this: "The carrying of substances into the tissues is simply the transmission of electro-positive and electro-negative elements in certain directions according to their affinities or nature," not being acquainted at that time with the work of Dr. Herdman or the translation of Nernst.

It has often been stated, in discussing cataphoresis, that the galvanic current can be passed through a liquid or tissue producing cataphoric flow without electrolysis. This error has been very emphatically nailed by Dr. Price in his paper, "The Phenomena of Cataphoresis;" and I wish here to state it in the words of Meyer. In commenting on this error, he says, "This is quite contrary to our experience, which shows that electrolytic conductivity begins with the feeblest electro-motive force, obeying Ohm's law if polarization of the electrode is prevented." (Meyer's "Modern Theories of Chemistry.") The fundamental law of electrolysis, which was established by Faraday, and confirmed by the experiments of Beetz, Hittorf, and others down to the present time, is as follows: The number of electro-chemical equivalents of an electrolyte which are decomposed by the passage of an electric current during a given time is equal to the number of units of electricity which are transferred in the same time.

According to the theory of Claussius, the decomposition and recomposition of the electrolyte is continually going on, even when there is no current, and the feeblest electro-motive force is sufficient to give this process a certain degree of direction, and so produce the currents of the ions and the electric current, which is part of the same phenomena. Within the electrolyte, however, the ions are never set free in finite quantity; at the electrodes the ions accumulate, etc. (Clerk Maxwell, 1881.) This, however, does not account for the difference in fluids and soluble substances, some being conductors, others not. There is apparently no physical difference between electrolytes and non-electrolytes, conducting liquids and non-conducting liquids. Chlorid and perchlorid of tin are both capable of aqueous solution, but the first is a conductor and the second a non-conductor, so there must be a condition of the affinities which enables the molecules of one to resist the polarization, while in the other the ions are free to travel and convey the current.

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*Italics mine.

I cannot do better than refer again to the masterful paper of Dr. Price, "The Phenomena of Cataphoresis," for a lucid explanation of the behavior of the ions in the decomposition of a fluid conductor, and then here endeavor to prepare you for the assimilation of what is there offered, for I feel that the behavior of the ions of an electrolyte has been talked about too freely without first having had a comprehensive explanation of what is meant by the ions. The intimate connection between electricity and chemical affinity has been recognized since voltaic electricity has been known. Berzelius attempted to establish a system in which all chemical reactions could be accounted for by the difference in electrical potential of the elements presented, which was of considerable benefit in classifying the elements, but the deductions were not in unison with phenomena observed in organic chemistry, and have fallen into oblivion as far as strictly chemical science is concerned. The electro-chemical list is not found in modern works on chemistry, but the list and classification is of great benefit to electro-metallurgists, and, if it can be proved that electro-cocain anesthesia depends, primarily, on electrolytic decomposition, then the electro-chemical series as formulated by Berzelius is something which should be familiar to the student of so-called cataphoresis.

### ELECTRO-CHEMICAL SERIES.

*Negative End.—*

Oxygen.
Sulfur.
Nitrogen.
Fluorin.
Chlorin.
Bromin.
Iodin.
Phosphorus.
Arsenic.
Boron.
Carbon.
Antimony.
Hydrogen.
Gold.
Iridium.
Platinum.
Mercury.
Silver.
Copper.
Tin.

Lead.
Nickel.
Iron.
Zinc.
Manganese.
Aluminum.
Magnesium.
Lithium.
Sodium.
Potassium.
*Positive End.*+

In the above list, which includes only those elements in which we are interested, each element is negative to every element below, and positive to every element above, the difference in electro-chemical behavior conforming to their separation in this list. Thus, oxygen is negative to hydrogen and much more so to potassium; and hydrogen, which is positive to oxygen, is negative to potassium. Reference to this list will explain the difference in electro-motive force-voltage between a voltaic cell, composed of zinc as the positive element and copper or carbon as the negative, and one in which zinc is the positive and iron, for instance, the negative. If cost of material did not enter into the question along with some other difficulties, magnesium, or, still better, metallic sodium or potassium as positive element would give the powerful cell.

Familiarity with this classification puts one in position to take the list of remedies used electrolytically and readily classify them as anaphoretics and cataphoretics, especially if they are inorganic; and, if the latest theories are correct, the organic—*i.e.*, the vegetable alkaloids—as well. This statement must be modified to take cognizance of the secondary reactions which the affinities of the ions exert on the different substances with which they come in contact, more especially on the electrodes, the electrolyte, the indifferent solvent, and on each other. These secondary actions have not, of necessity, any connection with the passage of electricity, and probably have nothing to do with it. They obey the ordinary law of chemical reactions and are characterized by the fact that the ions are in the nascent state, and are consequently in a condition to act very energetically. These secondary actions are apt to conceal the procedure of electrolysis to such an extent that gross errors can only be avoided by one thoroughly equipped for determining the rates of migration and recognizing conditions at the poles.

This work has been seriously inaugurated by Dr. Price, and some of the preliminaries were embodied in a paper read by him before the Second District Society, at Brooklyn, in January last, and published in the *Items of Interest* for May, 1898. This work gives promise of furnishing matter for a valuable volume, if he carries to a finish all that he apparently has planned.

In electro-therapeutical work any current transmitted through tissues must be conveyed by way of the aqueous solutions of which those tissues are so largely composed; so, whenever the two live electrodes are placed in proper contact with tissues, there must be started a double progression of the ions of the electrolytes throughout the path of the current. By taking cognizance of the composition of these solutions, we are in position to grasp more definitely the changes which occur at the electrodes, and what is probably the change of condition within the tissues because of the ionization.

Of the components of the tissues through which we pass the current, we are interested simply in the proximate principles furnishing us the electrolyte,—*i.e.*, the water of the body and the various salts held in solution, which give conductivity. The resistance of a tissue no doubt is in direct proportion to the salinity of the water it contains. The blood, which is the main conductor, contains a considerable percentage of sodium chlorid, with some sodium bicarbonate, potassium chlorid, calcium phosphate, and magnesium phosphate. (Foster.) It will be sufficiently accurate to say that in the blood we have a one-half of one per cent. solution of sodium chlorid, with traces of the other salts mentioned. The incineration of brain and nerve tissue gives in the ash the following: Potassium sulfate, potassium chlorid, potassium phosphate, magnesium phosphate, sodium phosphate, sodium carbonate.

In the most complicated electrolytic process in which we are concerned—the electro-cocain anesthesia of sensitive dentin—we have a metallic electrode in contact with an aqueous solution of a salt of a vegetable alkaloid, this solution being in contact with another aqueous solution of mixed salts contained in the tissue within the tubuli of the dentin, this tissue being continuous with the pulp-tissue, which contains a large proportion of the same aqueous saline solution. Thorpe defines vegetable alkaloids as nitrogenous carbon compounds possessing basic properties. A salt of a vegetable alkaloid is recognized as being a compound which in solution can be electrolyzed, the alkaloid radicle going toward the negative pole and the acid radicle to the positive.

With a solution of hydrochlorid of cocain, $C_{17}H_{21}NO_4HCl$, in the cavity of a tooth in contact with the dentin, and also the positive electrode which is connected to a proper source of galvanic current, the negative being placed at some more or less remote surface of the body, we have all the conditions for the successful introduction, I believe, of this anesthetic agent, or any other soluble salt of a vegetable alkaloid, by the double migration of ions, which, in this case, must be compound radicles. We have the conditions, I believe, which make it probable that, as the ionization has been in force for sufficient time, we will cause the basic radicles naturally contained within the pulp-tissue to be replaced by vegetable alkaloid radicles throughout its substance.

It matters little what term we apply to this process if we have a lucid and tangible understanding of what takes place. If the process can be proved to be mainly electrolytic we will be in position to make more rational use of it than if we look upon it as a *peculiar flow* induced by a galvanic current, etc., and calling for the coining of new terms.

# ABSCESS UPON TEETH WITH LIVING PULPS.

BY EDWARD C. KIRK, D.D.S., PHILADELPHIA, PA.

(Read before the Union Meeting in Baltimore, June 3, 1898.)

UNTIL within a comparatively recent period the existence of a dento-alveolar abscess was generally believed to be pathognomonic of a dead and putrescent pulp. Acting upon that belief the practitioner felt no hesitation in at once securing access to the pulp-chamber of all cases presenting evidences of a suppurative condition involving the pericementum. The indiscriminate use of the drill developed occasional proofs of the faulty character of the accepted generalization that an alveolar abscess necessarily meant a dead pulp, the mistake in diagnosis being evidenced at times by the characteristic reactions of a wounded vital pulp.

The writer has not made a systematic search for recorded cases of this character, but certain it is that they were recognized as early as 1874, as shown by the report of a case by Dr. E. T. Darby in the Proceedings of the Odontological Society of Pennsylvania for 1879. Occasional references to cases of alveolar abscess upon teeth with vital pulps are found in dental periodical literature subsequent to the date named, and there is reason to believe that the possibility of such a condition is now pretty generally recognized by the dental profession. Dr. W. E. Walker reported three cases at the annual meeting of the Mississippi Valley Dental Association in 1895, and these again with two additional cases at the meeting of the Southern Dental Association in 1898.

Dr. D. D. Smith, at the Union Meeting of the Maryland State Dental Association, Washington City Dental Society, and Virginia State Dental Association, held at Old Point Comfort, Va., last year, described in a paper entitled "Pericemental Abscess" an inflammatory condition of the pericementum upon vital teeth which, in so far as its distinguishing characteristics are concerned, belongs to the class of inflammatory processes here under consideration. The clinical phenomena attending the evolution of this condition are in general those of other inflammations of the pericemental membrane, but modified somewhat as to their violence. A slight uneasiness about the root of the affected tooth is first felt, followed by increasing tenderness to percussion, slight extrusion of the tooth from its alveolus, increasing pain of a dull throbbing character, localized swelling which does not become diffused over a large area, no tendency to the infiltration of surrounding tissues, no burrowing of pus into adjacent territory, finally localization and pointing of the abscess and evacuation of the inflammatory products upon the gum-surface at a point close to the inflammatory focus. The discharged contents differ from the pus of the usual dento-alveolar abscess of pulp infection, both as to quantity and general character, being relatively slight in amount and mucoid or glairy in appearance, sometimes streaked with blood, and not so yellowish as pus due to infection by pyogenic cocci. After evacuation of the abscess cavity the outlet usually heals spontaneously and the disorder remains quiescent for a greater or less period, when a renewal of the outbreak may occur, with a tendency to repetition indefinitely until the tooth is finally lost through general necrosis of its retentive ligament, the pericementum.

In the study of the pathology of these cases we are confronted with an obscure condition and one which presents an etiological problem of much complexity.

The purpose of this communication is to bring into orderly relationship certain isolated observations which have been from time to time made, and from such data to deduce some conclusions which, though by no means intended to be final, it is hoped may serve to place the condition in a clearer light for future study.

Certain features clearly differentiate this form of abscess from dento-alveolar abscess caused by infection of the pericementum via the pulp-canal. First, it is found upon teeth with vital pulps. Second, its location may be in any portion of the pericementum, while in the usual form the seat of infection is almost invariably the apical region. Third, it is a disease found only in patients who have reached adult life. The ordinary form of dento-alveolar abscess may be found in patients of all ages. Fourth, it is almost invariably found associated with teeth of hypercalcified structure,—*i.e.*, those of flinty hardness and in which the tubular structure of the dentin has undergone that nutritive change which tends to make them translucent. Ordinary dento-alveolar abscess is found in teeth of all grades of structure. Fifth, abscess upon teeth with vital pulps is found in mouths generally free from caries, and is in no degree dependent upon caries as a cause. Ordinary dento-alveolar abscess is usually found in mouths where caries is active, and the abscess is usually dependent upon caries as a predisposing cause.

It will be seen then that we have to deal with a localized necrotic inflammatory process, in which the cause of the inflammation must be sought for in directions other than those which give rise to infective inflammation through the pulp-canal.

The pathological phenomena involved in abscess of the apical region caused by infection via the pulp-canal are so clearly made out that no one to-day has any reasonable doubt that the process is exclusively the result of bacterial infection. In fact, when any disease process is said to be the result of infection by micro-organisms we have come to accept the statement as a full and satisfactory explanation of the phenomena manifested, and are apt to overlook the fact that such an explanation is merely the bald statement of the terminal facts in a complicated intermediate chain of cause and effect. Having admitted that an invasion of tissue by certain bacteria may lead to an inflammatory reaction upon the part of that tissue and result in its partial necrosis and suppuration, we may ask by what means do bacteria produce such a result? Is it by their mechanical presence? While certain disease conditions produced by micro-organisms seem to furnish grounds for such a belief, the evidence is not sufficient to warrant the theory that they act generally as mechanical irritants. It has, however, been clearly demonstrated that in their vital evolution these minute organisms elaborate toxic substances which in some instances are of a high degree of virulence, that these toxins if present in sufficient amount effect a total functional paralysis of the cellular elements of a tissue and cause its necrosis and subsequent disorganization. It is then largely through the toxic character of their waste products (ptomaines) that they produce their effects upon living tissue.

It is to be borne in mind also that these toxins are not only poisonous to vital tissue, but to the micro-organisms themselves, for it has been shown that all bacteria perish in an excess of their own waste products. The application of these facts to the etiology of infective apical inflammation of the pericementum is sufficiently obvious.

When we endeavor to explain the etiology of abscess of the pericementum of vital teeth as a result of infection by bacteria, the relation of cause and effect is less obvious because the possibility of access of bacteria or their ptomaines via the pulp-canal is eliminated as a factor, and the modus of the infection must be sought elsewhere. There being no break in the continuity of the gingival attachment in the cases under consideration, we naturally consider the vascular circulation of the tissue as the most probable means of entrance for the irritant which is the exciter of the inflammation in question. That pathogenic bacteria may exist in the blood-stream and, meeting a *locus minoris resistentia* in a tissue, may set up an inflammatory process at that point is a well-established pathological fact, and it is not at all impossible that the immediate cause of pericemental abscess may be accounted for in that way. There is, however, the question of a predisposing cause, which in these cases is of vastly more importance, and which when clearly made out will enable us to cope rationally with a group of dental pathological conditions which have been the *bêtes noires* of dental practice since its genesis as a calling.

Broadly considered, any inflammatory action is a disturbance of the normal processes of nutrition, and this is true of both general and local inflammations, the disturbance being proportioned to the intensity of the irritative action. Where bacteria and their products are the excitants of inflammation, their effective invasion is conditional upon the vital status of the tissue concerned. If the vital resistance of the tissue is sufficiently high it becomes immune, and bacterial invasion is impossible. The vital potential of a tissue is the result of the sum total of its nutritive processes normally performed. Any interference with the normal nutritive process therefore results in a diminution of the vital potential of a tissue, and renders it liable to invasion by bacteria with consequent inflammatory reaction. A disturbance of normal nutrition resulting in lowered vital resistance is therefore a precedent condition to effective bacterial invasion.

The nutritive disturbances which predispose to the particular inflammatory action under consideration are, in the opinion of the writer, those arising from auto-intoxication, which has two sources of origin,—viz, by toxic substances produced by the human organism as side products of its own nutritive processes, and second by the waste products of saprophytic bacteria acting within the digestive tract, particularly the intestinal canal.

It has been already noted as a general biological law that all micro-organisms perish in an excess of their own waste products, and the same law is equally applicable to macro-organisms, including the human being. It has been stated upon good authority that man produces within his body sufficient poison in six hours to kill him if it were not continually eliminated. These toxic substances under circumstances which interfere with their complete elimination are absorbed through the lymph-tracts, and, finding their way into the general circulation, ultimately exert their irritant effect upon all of the tissues of the body, the tissues reacting in various degrees in proportion to their relative powers of resistance and the amount of irritation to which they are severally subjected.

Toxins produced within the digestive tract by the action of saprophytic bacteria are absorbed and added to the sum total of poisonous material in the blood-stream, modifying its toxic effect in proportion to their amount and virulence.

The continual irritation produced as described reacts eventually upon the general nutritive processes of the body, and by establishing a so-called "vicious circle" brings about a permanent alteration of the nutritive processes which, when it has become chronic, we term a diathesis.

The establishment of a diathetic condition in which toxins are habitually produced and retained in the blood-stream and tissues marks the culmination of a graded series of nutritive changes, during which the production of toxins has gradually progressed with consequent increasing irritative effect upon the tissues. The effect of the prolonged irritation brings about permanent structural changes in certain tissues, and reduces their standard of vital resistance to a point where they become extremely liable to necrotic inflammatory attacks from relatively slight sources of additional irritation.

For reasons not altogether clear the articular tissues appear to be particularly vulnerable to the irritative action here noted, and in their category we include the pericemental membrane.

The clinical phenomena manifested by a vital tooth, the pericementum of which is the seat of abscess, are of interest when viewed in the light of the foregoing presentation of the toxemic character of the irritant. It has been already noted that teeth so affected almost invariably show evidences of hypercalcification of the dentin. They are hard, dense teeth, semi-translucent, and usually free from caries. Evidently the functional activity of the odontoblastic layer of pulp-cells has been unduly stimulated throughout a considerable period of time by an irritant which has been of the right degree of intensity to induce a functional activity beyond the normal point, and that activity of function has resulted in the dense calcification of the dentin noted. It is also evident that the functional hyperactivity has been induced through the vascular supply to the odontoblasts as the only conceivable channel through which it could be expressed.

It is reasonable to assume that a corresponding excessive functional activity has been manifested in the histological elements of the pericemental membrane. Indeed, it is not uncommon to find evidences of hypercementosis upon the roots of these densely calcified teeth.

The theory has been advanced that the acute inflammatory outbreaks in the pericementum observed in these cases are caused by the over-calcification of the dentin cutting off its nutrition and causing the tooth as a whole to act as an irritant foreign body, thus giving rise to acute inflammatory reactions of its investing membrane. It must be evident that destruction of the nutritive supply to the dentin by over-calcification cannot, *per se,* cause the tooth to act *en masse* as an irritant foreign body any more than would destruction of the nutritive supply to the dentin by any other means,—pulp extirpation for example.

It seems more rational to attribute the diseased condition of the pericementum to the same causes which induced excessive calcification of the dentin by over-stimulation of the odontoblasts of the pulp,—viz, the action of toxic irritants in its vascular supply. It now remains to consider the nature and seat of the inflammation in these cases.

It is a fixed law of pathology that pus from an abscess tends to find its exit upon the surface, and that in so doing it follows the line of least resistance. Whether a pericemental abscess shall find its exit upon the gum-surface or at the gingival margin is practically determined by its location on the root, which in turn determines the line of least resistance. And again, whether it discharges upon the surface of the gum or at the gingival margin determines the name by which the inflammatory process shall be designated. If it should find exit upon the gum-surface it has been called with entire justification "pericemental abscess," but should exit of the pus occur at the gingival margin then we have a pus-pocket established, which shows no tendency to heal spontaneously and by infection from the bacteria of the oral fluids becomes a chronic suppurating surface, and is, in other words, pyorrhea alveolaris. The writer hopes it will be clearly understood that the etiological explanation of pyorrhea alveolaris here given is intended to be applied only to the special form of the disease here described, and is not offered as a solution of the causation of the whole group of disorders characterized by a flow of pus from the alveoli.

The diathetic factor in this disorder and the anatomical character of the tissue which is the seat of the lesion, taken together, present certain points for consideration which are interesting as furnishing a rational basis of classification of this disease with other allied arthritic disorders. Anatomists tell us that the union of a tooth to its socket is a joint of the order gomphosis, an immovable articulation, nevertheless containing the tissues common to joints in general and in such order and arrangement as are best adapted to the peculiar nature of their function. It has been called an immovable joint, but this is only relatively true, as such slight motion as is possible by virtue of the elasticity of the pericemental membrane is normal to the dento-alveolar articulation and necessary to the proper exercise of the masticating function of the tooth.

Beside the pericemental membrane or ligament of this articulation, Dr. G. V. Black in his classic study of "The Periosteum and Peridental Membrane" describes certain ectodermic glandular structures situated in the pericementum, lobulated in form and filled with lymphoid cells, which he calls lymphatic glands. In the same work he states that these glands are the seat of phagedenic pericementitis. While he describes most minutely the histological structure of these glands and designates them as lymphatics, he offers no suggestion as to their significance other than that implied by his designation. His reasons for the statement that they are the seat of pyorrhea alveolaris are based upon microscopic observation, a view which recent investigation by the writer tends to confirm.

The presence of these glandular structures in the pericementum is possibly explainable on grounds other than that they function as lymph-glands. Bearing in mind that the dento-alveolar articulation is anatomically a joint, should we not then expect to find represented in it those tissues which are commonly found in joints in general, and among them those tissue elements which enter into the structure of synovial bursæ? It is true that articular bursæ are found only in the structures of movable joints, but the dento-alveolar articulation is not absolutely an immovable joint, and it would seem not at all impossible that the lymphatic glands of Black represent the effort of nature to supply so much of synovial tissue as the limited mobility of the dento-alveolar articulation would functionally warrant.

The recognized biological tendency to work in harmony with a definite plan would give additional force to the idea that the development of synovial tissue in that position is an attempt to coordinate the dento-alveolar articulation with the other articulations of the body.

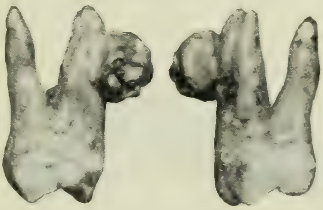
In this connection, with such a view it is interesting to note that Black has found the glandular formations of the pericemental membrane to be more abundant in the omnivora than in the carnivora, —*i.e.*, in that order of tooth doing relatively the larger amount of work,—and that they were more highly developed in that portion of the membrane nearest the gingival attachment in that specialized bundle of fibers which has been termed the *ligamentum dentis*, and therefore at the area of greatest mobility.

The close similarity of histological structure as between lymph-glands and synovial tissue and their common embryonal origin could, under the circumstances noted, readily give rise to a misapprehension regarding the function and significance of the pericemental glands. The exact nature of these glands is a matter of importance in connection with the present study, for should it be determined that they are synovial in character and admittedly the seat of phagedenic pericementitis and therefore of pericemental abscess, the relation of these inflammatory disorders to the arthritic diathesis becomes clear.

That pericemental abscess is a tophic abscess of the dento-alveolar articulation is the view accepted by the writer hereof, and that so-called gouty pyorrhea and pericemental abscess are but the local expressions of a disorder having a common constitutional origin and differing in clinical expression merely by the accident of position is also accepted. Both conditions may be found upon the same tooth, and both are amenable to a constitutional treatment which will successfully eliminate toxins from the blood and improve nutrition. Local treatment is simply palliative, and success can only be hoped for where both local and constitutional measures are conjointly applied.

The close agreement of the pathological phenomena as between gouty arthritis and this form of pericemental abscess is striking, for when minutely studied all of the phenomena attendant upon a gouty arthritis and the condition under consideration are quite parallel, even to the resorption of the articular surfaces of the bones, which finds its analogue in the apical and lateral erosions so often noted upon the roots of teeth the seat of this form of pyorrhea.

FIG. 1.



The pericemental tophus presents features of pathological and histological interest.

Through the courtesy of Dr. D. D. Smith, the writer was permitted to examine a specimen of the disorder which is a typical case.

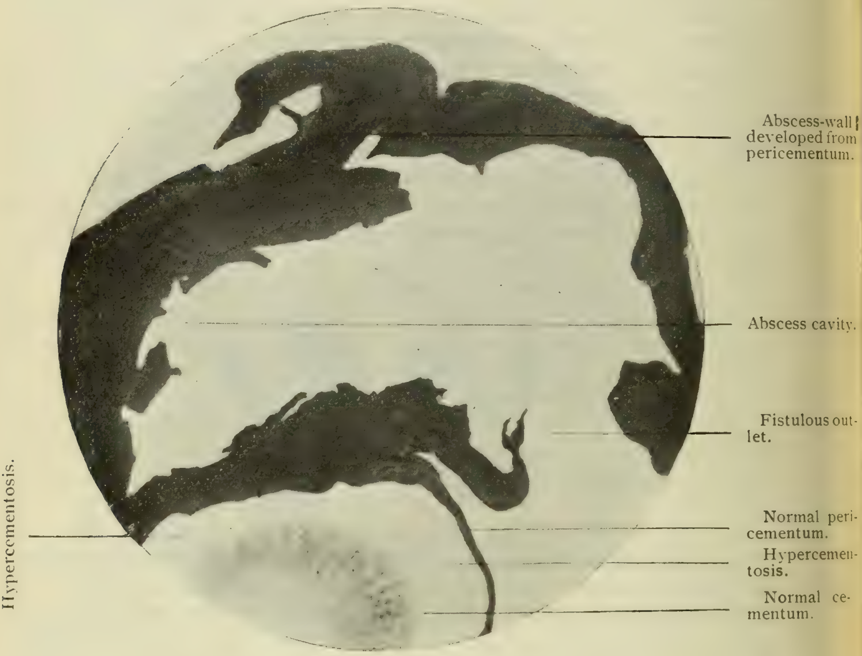
Fig. 1 shows two views of the abscess sac attached to the buccal aspect of an upper molar, about midway of the length of the root. The pulp was vital, and there was no evidence of caries on the crown. The tumor was as large as a small cherry. The specimen was sent to Dr. Robert Formad, of the Histological Laboratory of the University of Pennsylvania, for section. After decalcifying and imbedding, the tumor was serially sliced transversely from base to top and through all the roots of the tooth, and the sections mounted and submitted for examination.

Fig. 2 is taken from a section about the middle of the tumor and through its fistulous outlet. It will be seen that the tissue shows the ordinary reactions attendant upon a suppurative inflammation of connective tissue. It shows one important feature which probably differentiates this form of abscess from that of the apical region due to pulp-infection,—viz. that the inflammatory focus is within the structure of the pericementum and not beneath it.

There is no denudation of the cementum, the focus of inflammation being intra-pericemental and not sub-pericemental. While it is not possible to generalize upon a single observation, it is highly probable that the intra-pericemental location of the tophic abscess of the dento-alveolar articulation is characteristic.

The precedent stimulative irritation of the pericementum is clearly shown by the two nodes of hypercementosis adjacent to the focus of acute inflammatory action.

FIG. 2.



While I am conscious of having but roughly sketched some of the pathological phenomena which attend the study of these interesting cases, I am also conscious that I have trespassed greatly upon your time and patience. To have treated the subject exhaustively would have been to write a treatise. The most that I could hope to do under present circumstances was to make a few suggestions, and these I offer for your consideration.

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# ORAL HYGIENE AND MOUTH-WASHES.

BY W. A. BARROWS, D.D.S., BUFFALO, N. Y.

(Read before the Eighth District Dental Society, Buffalo, N. Y., April 26, 1898.)

THE mouth is the gateway for the entrance of disease, consequently it is right here that the fight must begin to keep the enemy out; for bacteria are present everywhere, and whether they exist in the food we eat, the water we drink, or the air we breathe, some infectious germ gets in and is liable to develop disease whenever the "natural resistance" of the body is lowered and other conditions are favorable. But the supreme fight must be made against the enemy already within the entrance, for bacteriological research has proven that the mouth is a perfect "hot bed" of bacteria, or to express it more scientifically, the oral cavity is a prolific culture-medium for the growth and propagation of micro-organisms. Some of them are harmless and some of them dangerous, but they are *there* anyhow and capable of producing disease, either local or systemic, and, though the trouble may be purely local at first, yet continued neglect will in turn affect the general health; while on the other hand, if one's vitality is below par and remains so from inattention, then evidence of the fact will become manifest in disturbed conditions in the mouth. There is a much closer relationship here between cause and effect than the dentist's clientèle has any idea of. Then is it not the positive duty of every dental practitioner to stand in the rôle of an educator, and by iteration and reiteration stamp upon the mind of his patient the fact that in a large degree a healthy mouth means a healthy body?

While so much is being said nowadays about bacteria of the mouth, the question naturally presents itself, Why is it that this organ furnishes such a fertile field for their growth? Before answering, let us consider what conditions are requisite for the propagation of micro-organisms. Investigators say there must be a proper soil, a sufficient amount of moisture; they must be kept in a state of rest with little light, and also at a uniform temperature, or nearly so, of 98° F. Does not the mouth meet these requirements most admirably? There you have moisture, proper temperature always, rest undisturbed a portion of the time, and for a soil, albumen and earthy salts. Is it surprising, then, that germs take root and flourish there?

The tongue, the teeth, the gums, and tonsils are all contributory to the growth of bacteria,—the teeth and gums especially so. From time immemorial the appearance of the tongue has been regarded as an index of conditions varying all the way from a state of health to that of positive diseases, according to the color and extent of its coating. What is commonly known as "furred tongue" is generally associated with gastric disturbance, both by physicians and the laity,—the popular idea being that a disordered stomach causes a "bad tongue." Yet there are those who have a contrary belief and maintain that a filthy condition of the mouth has its reflex upon the stomach; but be this as it may, a "furred tongue," whether the "fur" be thick or thin, affords a mighty good nesting place for bacteria.

The tonsils are often in a state of inflammation, but even if there be little, or none, the crypts are peculiarly susceptible to certain germs, and any found floating in the saliva would be likely to lodge there. Again, the foul-smelling secretions from these same crypts will produce a breath of the rankest kind.

The teeth furnish a constant supply of pabulum for the multiplication of micro-organisms in the fermentation of food which becomes lodged in their interdental spaces. Physiologists have shown that foods of the starchy order, by coming in contact with the saliva, produce chemical changes that result in the formation of lactic acid, and Professor Miller has found that lactic acid is the cause of dental caries. And dental caries in itself is a focus of disease because of the constant danger from contact of other and more dangerous organisms that may find lodgment in the mouth. If decay progresses so far as to involve the pulp, then the condition becomes more serious, because it is likely to terminate in death, putrefaction, and abscess.

Concerning the gums, many practitioners seem to forget that upon the general health and hygiene of the oral cavity depend the health and usefulness of the teeth, and so will spend weeks and months in restoring the dental organs to their proper status, while they will do little or nothing for the gums, except, perhaps, to recommend a wash.

The gums constitute a certain tissue, found only in the mouth, surrounding the teeth and as a covering for the palate and alveolar processes. Its relation to the mucous membrane of the cheeks and fauces and about the roots of teeth is one of continuity. When in a healthy condition the gums should be of a delicate pink color, and not red as we frequently find them. They will stand much abuse, and even injury, without much bleeding, and recover rapidly therefrom without the usual inflammation incident to wounds in other soft parts of the body.

The chief form of disease we have to contend with, so far as the gums are involved, is pyorrhea. And what is the cause of pyorrhea? For the sake of convenience we will say that "it is a condition that confronts us," and let theory go. It is quickly recognized when brought to our notice by certain symptoms, as a twisted or irregular position of the tooth, more or less looseness, and frequently elongation. The gum is congested, bleeds at the slightest touch, and is accompanied by marginal recession. Upon examination with a probe it is found to be separated from the tooth, and upon pressure discharges pus. Pyorrhea, if neglected, becomes offensive and loathsome, offering a most inviting field for germs of all kinds to propagate.

We have briefly shown how the different organs of the mouth may take on pathological conditions that must of necessity contribute to bacterial growth, and thereby place the oral cavity in a most unwholesome and unhygienic state. Let us now consider what may be done to prevent the festive microbe from getting in his work. Beginning with the tonsils, a patient having chronic tonsillitis would better consult a physician, and he would probably advise immediate removal. In our opinion, it would be wiser to try systemic treatment first, leaving surgical treatment as a last resort.

Patients are instructed to clean the teeth, of course, but rarely to clean the tongue; and yet the latter is sometimes quite as necessary as the former,—that is, when the tongue is coated. The coating should be removed by scraping. This is easily done with a spoon;

then by spraying or swabbing with three per cent. pyrozone the tongue is effectually cleansed. Professor Edward C. Kirk recommends brushing the tongue, instead of scraping, using phénol sodique upon the brush as a cleanser.

For the complete care and preservation of the teeth there must be faithful co-operation between dentist and patient. At the first appointment the teeth should be cleaned *first*, by removing all deposits and stains. Is it necessary to say that this operation should be performed thoroughly? During succeeding appointments the teeth should be filled as needed, especial care and skill being applied to the treatment of devitalized and abscessed teeth. Before dismissing the patient explicit directions should be given regarding the personal care of the teeth at home, explaining the importance thereof. Go into particulars, telling how *often* the tooth-brush should be used and *how* to use it, and why at night preferably over other times. What kind of a brush to buy: not the stiffest one in the whole department store. What to brush the teeth with,—that it should be a dentifrice distinctively, and not salt, or cigar-ashes. That whether a powder, or paste, it should possess antiseptic as well as detergent properties. Then explain why a toothpick is quite as necessary as a tooth-brush, and that a quill pick is better than a wooden one, and that floss silk is more effectual than either.

The treatment of inflammation of the gums and its resultant pyorrhea must be both mechanical and therapeutical, and there must be the same honest and faithful co-operation on the part of patient and practitioner as in the case of the teeth. It is still a mooted question regarding the permanent cure of pyorrhea, and it must continue to be so as long as there are a hundred, or more, theories extant as to its causation. To those who can cure it I would say, go ahead and do it. But if the rest of us cannot, then we can do the next best thing,—do the best we can,—which will result in checking the progress of the disease, for a time at least.

The different steps in the treatment of pyorrhea should be taken, I think, in the following order: (1) *Thorough* removal of all deposits. (2) Application of remedies. (3) Correction of occlusion. (4) Fixation. Dull-edge scalers should be used in removing deposits, and in extreme cases this may require two or three hours of persistent effort to accomplish the purpose, but thoroughness is important.

In applying remedies there are many to select from, such as pyrozone, diluted sulfuric acid, lactic acid, carbolate of potassium, iodin, trichloracetic acid, chlorid of zinc, and others. Use that which in your own experience has produced best results.

Elongation is a very frequent symptom accompanying pyorrhea, by which the affected tooth is subjected to constant irritation by striking prior to the other teeth. The necessity of correcting this malocclusion is apparent. Equally important is the retention of loose teeth in a fixed position by ligation or banding. Such teeth need *rest absolutely*, and they should be held firmly against all motion. To supplement the dentist's efforts the patient should be directed to stimulate the gums by finger massage several times a day; also to use an astringent and antiseptic solution an equal number of times.

And now, incidentally, a word or two about mouth-washes. There are plenty of them, surely. I will mention a few: listerin, borin, euthymol, borolyptol, euformol, bensolyptus, boro-bornyl, glyco-thymolin, Wampole's antiseptic solution, Phillips's milk of magnesia, sanitol, formoseptol, and thycalol. The published formulæ of these solutions disclose the fact that a majority of them have several of the ingredients in common, and also that the present popularity of formaldehyd has prompted manufacturers to give it a conspicuous place.

A reliable preparation for a mouth-wash should possess certain negative and positive properties. It should be antacid, non-toxic, non-escharotic, non-irritant, non-coagulant, and non-staining. On the other hand, it should be detergent, deodorant, astringent, slightly alkaline, or neutral at least; a powerful germicide and absolutely safe. Anything more? Yes, it should have a pleasant taste and an agreeable odor. It must be acceptable to the most fastidious, and not suggestive of unmentionable diseases for which many mouth-washes are also prescribed. The task of finding a solution to meet all these requirements, and yet be powerful enough to destroy bacteria in the short time that it remains in the mouth, is the most difficult we have to deal with in the hygiene of the oral cavity, for it is a question of seconds, *not minutes*, in which the germicidal property of the wash must do its work. We have had experience with most all the mouth-washes enumerated, and can say that some of them in certain respects are very good, but we are of the opinion just now that thycalol is a little ahead in the race. The manufacturers announce that tests have been made in the mouth itself by Professor Miller's method, with the result that bacteria were destroyed in fifteen seconds. So far as we know, thycalol has the advantage over all other mouth-washes by reason of its containing saccharin, which, according to Professor Miller, is the most rapid germicide for oral use.

That the daily use of an antiseptic solution is most important is a fact which is admitted, or should be, by every progressive practitioner, and if the solution is pleasant and agreeable its constant use can be depended upon with more certainty.

In conclusion, we would say that the connection between bacterial growths in the oral cavity and severe disturbance of the general health is, we believe, generally recognized. There are those who carry more filth in their mouths than they would tolerate on their skins, and we as dentists must preach the gospel of oral hygiene.

# PORCELAIN ENAMEL INLAYS.

BY N. S. JENKINS, D.D.S., DRESDEN, SAXONY.

In the May number of the DENTAL COSMOS appears a report of a demonstration by Professor Darby, before the New York Odontological Society, of my system of porcelain enamel inlays. Fortunately this report appears at the moment when my long-continued experiments have reached a period which permits me to publicly confirm the announcement which this distinguished member of our profession, in his enthusiasm for progress, has made, even when in possession of an incomplete apparatus and imperfect material, for he was able to see, before the end was reached, what that end must inevitably be.

Some five years ago, after bitter disappointment in trying to adapt to a peculiarly difficult and exacting practice the various methods of porcelain and glass inlays then existing, I determined to invent a material that should unite the good qualities which both these substances promised, but provokingly withheld. At the outset I was met by the necessity of finding a body which could be melted in a gold matrix. Only with gold foil could an exact impression of a cavity be obtained. Only gold would permit itself to be burnished to an imperceptible line, and even gold must be used so thin that it would not clog at the corners and yet be stiff enough to be brought out intact. Then it became a question how this delicate matrix could be made to keep its form unchanged during the process of melting, and how a body could be found that should simply melt and not stick to the gold so as to draw the matrix with it, and which should, while fusing to a solid mass with an indestructible surface, still not flow like water, but permit any desired contour to be obtained. These and all other difficulties were finally overcome, and on May 15, 1897, the body was definitely decided upon, and more elaborate studies than had thus far been necessary were commenced in color. On March 24, 1898, the last indispensable experiment in color was concluded, and the work was pronounced finished. For more than a year previous the results obtained had been so surprising that I was besought by various esteemed colleagues to allow them to make use of the material, however incomplete it might seem to me. To a few of them I sent the product as it was being developed, so that their practical experience might run parallel to mine, and we happily all reached the same conclusions.

My own practice contains a complete record of the progress of this invention, from fillings which would turn black or gray on the surface, roughen at the edges, and check and crack in every direction, up to those perfect inlays which are unchangeable in color, indestructible in surface, exact in edge, and capable of resisting the force of mastication.

This material can be melted in either gas or electric furnaces, but its own apparatus, substantially as described by Professor Darby, is essential to its proper use. With it a steady and easily controllable heat can be obtained, and every stage of the process of melting can be observed,—a matter of first importance regarding color and contour.

Each step requires skill, taste, patience. The cavity must be prepared without undercuts, and the edges polished and well defined. Diamond burs are most valuable for the polishing of edges. The operator should have them of every size, and exert only a light touch when using them. The most delicate and nervous patient can bear the smooth working of a diamond bur kept wet with water of such a temperature as is suitable to the case. Cracked and pitted walls may be removed if desired for reasons of strength or appearance, for the porcelain enamel is stronger than a weak tooth-substance, and can be made as handsome as a tooth in its best estate. With the walls of the cavity sufficiently well polished, the impression can usually be so perfectly taken with No. 30 gold foil by the pressure of pieces of spunk or cotton as to make burnishing of the edges unnecessary. Overlapping edges of the foil can be cut away with a sharp lancet, if desired, while the inlay is still in place. There is a knack, which comes only by practice, in removing the inlay from obscure and complicated cavities without injury, but that is something which every good operator can easily learn. It requires care to place the inlay on its pasty bed of asbestos and water so that every part of a complicated impression is equally supported, and it takes patience to heat up slowly and melt deliberately, especially if the patient is waiting. I have found it best to have the melting done by a woman. Women are more careful and more patient than men in such work. I took an intelligent young girl who had had no previous technical training, and in a fortnight she had learned to pack the powder properly and melt it to an exact line as well as the most skillful laboratory workman could do, and with less liability to accident.

The setting of the inlay is a matter of great importance. Almost any good phosphate will answer if only the operator is sufficiently familiar with its qualities. Cavity and inlay being perfectly dry, a little cement is smeared into every part of the cavity, and upon the bottom of the inlay as well, when the latter is brought into place and the surplus cement carefully wiped off. The final pressure is then usually given with a piece of orange-wood cut to a wedge shape and placed against the center of the inlay. By a firm but gentle pressure every particle of surplus cement oozes out, if it has been mixed to the right consistence, and leaves no visible line if the inlay fits perfectly. Very quick-setting cement is, in almost all cases, to be avoided.

The advantages of this method are incontestable both to patient and operator. It is immeasurably easier for the patient to bear than operations in gold. Invalids and morbidly sensitive patients who would otherwise often be condemned to frequent renewal of temporary fillings can easily endure permanent operations made in this manner. Immediately after the inlay is set the tooth ceases to be sensitive to thermal changes, and a capped pulp under this filling behaves in a most exemplary manner. The perfectly made inlay, perfect in form and color, as every one may be with sufficient care, is not to be detected by the unaided vision. Patients who have once experienced the value of this method will cross the continent of Europe at any cost of time and trouble to secure such treatment again.

The advantages to the operator are not less apparent. It relieves him from the physical and nervous strain of packing gold in almost all large cavities, and yet opens to him a field in which he may be sure that there will be no danger of his dearly-bought manual dexterity deteriorating, and its use will broaden, not contract, his professional horizon. As in working gold, there will always be with this system the external difference between the competent and the incapable, the industrious and the indolent, the intelligent and the stupid, the honorable and the rascally practitioner; but I have no fears as to the position which it will attain and retain in the estimation of both patients and dentists. It is now in the hands of many of the most eminent operators in Europe, and their encomiums do much to repay me for labors which have been as arduous as their results have been satisfactory. The practical question remains, Will this work pay? Certainly it will often take more time than to make operations with gold or amalgam, but European experience, so far as I know, is that it easily commands better fees than would gold work in the same position.

I have dwelt chiefly upon the use of porcelain enamel in inlays, since here is the greatest field of labor with all accomplished dentists, but for pivot-teeth and crowns it is also unrivaled. It can be used to attach teeth to pivots, to cover platinum or pure gold bands at the necks of teeth, to build up or to give a gum to teeth designed for setting on vulcanite, and to make whole crowns for molars where the bite is close and there is too little room for an ordinary porcelain crown, and the only other expedient would be an unsightly gold crown. When once familiar with this material, any ingenious dentist will find many cases where it can be applied to the restoration of crowns and to other forms of artificial teeth with most satisfactory results.

## DOUBLE RESECTION OF THE LOWER MAXILLA.

BY EDWARD H. ANGLE, D.D.S., ST. LOUIS, MO.

In the last issue of the Dental Cosmos was published an account of the double resection of the lower maxilla of a patient in this city—probably the first operation of its kind.

As the writer was first to suggest this operation, and has for four years been discussing with surgeons its prognosis, some suggestions as to technique and plans of fixation may not here be amiss, especially as he believes that if the operation be properly performed it may become of considerable use and importance, for in those extreme types of malocclusion illustrated in Figs. 1 and 2,* and familiar to every one, the proper functions of the teeth have become almost wholly impaired, as well as speech greatly interfered with, and the appearance of the patient transformed to marked deformity, constantly attracting attention and comment and a source of humiliation to the patient; and, if he be possessed of a sensitive nature, his condition becomes truly pathetic. Any ortho-

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*Supplement to The Angle System of Regulation and Retention of the Teeth and Fractures of the Maxillæ, now in press.

FIG. 1.

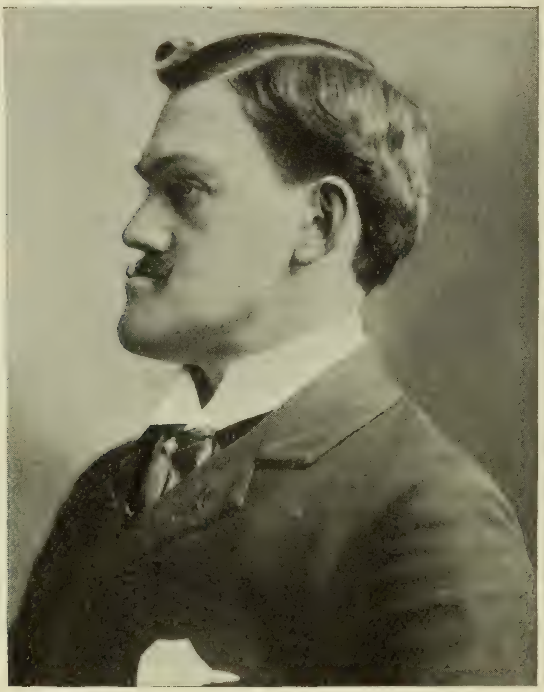
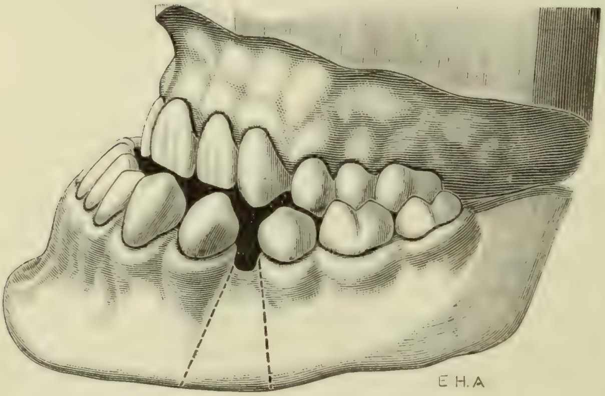


FIG. 2.

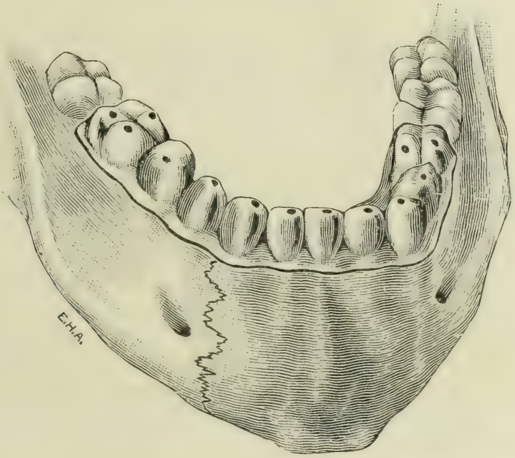


dontic procedure is powerless to render improvement, and double resection becomes the only resort.

If, then, the operation can be made practicable, certainly it must soon take its place among the useful operations of modern surgery.

The plan of operation which I would suggest in these cases is that careful photographs be first taken of the patient, and two accurate models made of the lower dental arch and one of the upper which will show as much of the gums and form of the jaws as possible (which was not done in the case reported). One of the plaster models of the lower jaw should then be sawed through and the sections removed. The positions and extent of these sections must be carefully experimented with until the three remaining sections of the plaster model can be made to best harmonize with the upper arch, and the teeth be in best possible occlusion with those of the upper jaw. These sections of the plaster model should then be cemented or waxed together, and over this reconstructed model a vulcanite or metal splint should then be formed, as shown in Fig. 3, and by careful comparisons and measurements of the reconstructed model with the uninjured model, the exact size and form of both sections of bone to be removed should be determined so that there may be no guessing as to the relations of the bone, and complete apposition of the ends be made possible.

FIG. 3.



As there is more or less lingual inclination of the lower incisors in all of these cases (most pronounced in some), it is certain that the sections of bone to be removed must not be parallel on their sides, as they were in the case reported, but wedge- or V-shaped, if we would gain the best positions and consequent occlusion of the incisors, as well as appearance of the chin.

The teeth having been thoroughly cleansed just previous to the operation and the splint in readiness, the sections of bone corresponding accurately to those determined upon, as already described, should be removed, the anterior section placed in apposition with the posterior sections, and the splint placed in position and cemented upon the teeth with thinly mixed oxyphosphate cement; and, if the operation has been skillfully performed, it will be found that the most rigid and immovable support is given to the reconstructed jaw, a plan far more efficient and in keeping with modern plans of aseptic surgery than is possible with that crude, unstable, and unmechanical plan of wiring the ends of the bone together which was employed in the operation reported.

It seems remarkable that surgeons will persist in ignoring the natural and stable attachments which may be given through the teeth for the fixation of jaw-bones, and will still continue to wire the ends of the bone together in the treatment of fractures of the maxilla, notwithstanding the innumerable failures to gain union which have been reported and which are constantly occurring, not to mention the faulty occlusion established as a result of this method of fixation.

The plan of making wounds which must become septic, on each side of the wound designed to treat, might have been excusable in the days of Buck and Kinloch, but modern surgery demands better methods.

Had the plan of treatment indicated been followed in the case reported, the writer believes the occlusion of the teeth would have been far better; the bones would have become united as speedily and with as little inconvenience to the patient as we know is possible and now so commonly gained when an ordinary double fracture of the maxilla is properly treated. Two points, however, of much importance have been established as a result of this operation. First, that union of the bones will take place; and, second, that the vitality of the teeth in the anterior section of the bone was not impaired. These seemed to be the questions most often raised, especially by dentists, in discussing with the writer the practicability of the operation.

# CORRESPONDENCE.

## THE DENTAL LAW OF NEW JERSEY.

TO THE EDITOR OF THE DENTAL COSMOS:

*Sir,*—In the May issue of your journal you publish an editorial which apparently is intended as a review of the recently enacted dental law of New Jersey; fortunately you publish in the same issue the law itself, which, if read by any thinking man, will in itself refute your most unjust criticisms and misrepresentations, and also cause him to wonder why you so carefully selected the portions which you thought open to criticism, and as carefully avoided those which you could not but acknowledge were an advance.

There are several points in your editorial which it seems to me should, however, receive some attention.

For instance, on page 404 you say, "The dental law is enacted on the assumption that it is a measure for the general good of the community, which it accomplishes by protecting the public against the ministrations of incompetent practitioners, and still further as a wholesome corrective of the tendency upon the part of the colleges to graduate incompetent men." This our law most certainly does, by adding to the best features of the old law a preliminary educational clause, which will most decidedly act as a wholesome corrective of the tendency upon the part of the colleges to graduate incompetent men.

As to any change made by the board in the conduct of the examinations, as insinuated by you, it is too absurd to discuss, and shows an animus on your part that seems hardly in accord with the position which you occupy as editor of one of the leading journals.

Your comparison of the present law of New Jersey with the old law of Pennsylvania is still worse, and will certainly bring a smile to the face of any student of dental legislation. To any one not acquainted with your old law I would suggest a comparison, and I think their deduction would be that editorials from certain journals should be taken with several grains of salt.

On page 407 you criticise the reciprocity clause as follows: "This attempt at reciprocity is unique of its kind. The benefits of the clause are to be conferred only upon such as have a professional education not less than that required in New Jersey. But what is the standard of professional education required in New Jersey? The law does not specify. That is a matter for the board to determine. Therefore, the clause is really intended to be applicable only to those whom the board may consider fit, and in this, as in all other respects, the board is the final authority. It is true the Governor *may* remove a member for proven charges of incompetency, unprofessional conduct, etc., but even that is optional, and the law surrounds the board with such other safeguards as render that provision practically a nullity."

Here you object to the board being made judges of the fitness of a man under the exemption. Well, for what was the board appointed if not for this very purpose? If they are not to be judges of the fitness of candidates, no matter of what class, who is? Then, again, from your superior wisdom kindly explain how the law is to specify the standard of professional education required. In the latter part of this paragraph it is surprising to see how far you have been carried away, when you even attack the integrity of the chief executive of this state; it is almost equal to the attempt of a resident of your state, who occupied a high professional position, who, upon his attempting to influence the Governor of this state against the law of 1890, urging him to veto the bill, was politely informed that when he (the Governor) needed advice he would ask it from the professional men of his own state, and that he considered outside interference an impertinence that he would not allow.

On page 406 we find the following: "What has been the outcome? Evidently the legislative committee have for some cause, not at present apparent, failed in carrying out the wishes of the Board of Examiners. The student clause still stands in the new law, with such modifications as will ultimately and in the near future destroy its operation by limitation of time, but there still stands the other clause permitting the examination of a non-graduate upon recommendation of five practicing dentists, and the matter, therefore, so far as appearances go, is simply a case of tweedledum and tweedledee."

You have, as you may recollect, for a number of years been in the habit of referring to the constitutionality of every action which did not meet with your approval. Why do you find fault with New Jersey for not doing what would have most decidedly been an unconstitutional act, in doing away with the student clause of the law, without protecting those who had registered in good faith and giving them a chance to take the examination, for which perhaps they had been preparing for years? I am astonished to find that you were not aware that no law can be made retroactive.

But apparently the most objectionable portion of the law to you is contained in the following paragraph:

> "No person shall be examined by the said board unless he be twenty-one years of age, of good moral character, and having received a preliminary education equal to that furnished by the common schools of this state, and be graduated in course with a dental degree from a dental school, college, or department of a university recognized by said board; *or unless he shall present the written recommendation of at least five licensed dentists of this state, of five years' standing, that he is qualified for such examination;* or shall hold a diploma or license conferring full right to practice dentistry in some foreign country and granted by some authority recognized by the board."

From the tenor of your editorial one would be led to think that the dentists of New Jersey made the laws of the state, but we assure you, sir, that they do not. We have a legislature the same as other states, with the exception perhaps that ours is a little more alive to the interests of its citizens than some others; dentists or others may propose legislation, but, whatever the final form when passed, the law is the work of the legislature, and if flaws exist that body should be held responsible, even by satirical editorial writers.

So, in the quotation from the law just made, you severely criticise the examination and licensing of practitioners of five years' standing, and because of this provision you charge the dentists of New Jersey with inconsistency. In the quotation given above certain words have been italicized. If you will kindly read the paragraph omitting these italicized words, you will see what the dentists *suggested* to the legislature for approval, and we think you will find it quite consistent with all of our efforts for higher education. The italicized passage was inserted by the senate of the state, and was included because exactly similar provisions are to be found in other New Jersey laws of the same character.

Think it over again, Mr. Editor, and perhaps it may take another aspect and be, after all, a blessing in disguise. It certainly can do no harm, as it would be practically impossible for an incompetent man to get the necessary indorsements; and, if he did, he has to pass his examination before he can be licensed, and if he is not competent he is not very apt to get through. But, on the other hand, suppose some well-known and competent practitioner, standing high in the profession, perhaps a professor in a dental college,—for there are a number, I believe, without dental degrees,—wanted to come to this popular little state of ours, which seems to give our big neighbors so much trouble, would it not give him the opportunity which otherwise he could not possibly have, and which our big neighbors might regret exceedingly that they could not offer him?

I would also call your attention to the preliminary educational clause, and state that all applicants who cannot present credentials of the requisite standard are required to pass a satisfactory examination, conducted under the personal supervision of the State Superintendent of Public Instruction; in fact, this official has the entire control of all that relates to preliminary qualifications.

Yours most respectfully,  
G. Carleton Brown,  
*Secretary New Jersey Dental Commission.*

## THE SOUTHERN BRANCH OF THE NATIONAL DENTAL ASSOCIATION.

At the annual meeting of the Southern Dental Association at Asheville, N. C., in 1896, a resolution was adopted expressing the sentiment that it would be agreeable to that body if the American Dental Association should see fit to meet at the same time and place as the Southern Dental Association in 1897, in order that a matter that had been under consideration for a number of years, by committees from the two associations, might, as expressed by Dr. J. Y. Crawford, be acted upon "by the rank and file of the two associations, thus relieving the committees of a very onerous duty." This overture was accepted by the American Association, and the two bodies accordingly met on the third day of August, 1897, at Old Point Comfort, Va. Individually and independently each association received and acted favorably upon a report on the union of the Southern and American Dental Associations. On the 5th of August the two bodies met in convention, when the following resolution was adopted: "*Resolved*, That the members of the American Dental Association and the members of the Southern Dental Association do hereby organize themselves into a body to be known and styled the National Dental Association."

The constitution and by-laws presented by the joint committee were read and adopted, officers were elected, and thus was born the present National Dental Association. Article XIV of this constitution provides for the branches as follows: "Section 1. For the wider diffusion of the benefits of this association, the members of each division may form themselves into one or more separate bodies, to be styled 'branches.'" In accordance with this provision of the constitution, at the final session of the Southern Dental Association Dr. J. Y. Crawford offered a resolution, of which the relevant portion reads: "*Resolved*, That we now declare ourselves a branch of the National Dental Association." . . . By this constitutional action the Southern Dental Association resolved itself into the Southern Branch of the National. The

American Association having been national *per se* in name, claims, and territory, it could not become a branch of the National; it therefore went out of existence. As the members of the Southern Association became members of the National through their action in the formation of the National, by virtue of Section 5 of Article III of the constitution, which reads, "Article III, Section 5. It is hereby specially provided that all persons at present permanent members of the American Dental Association and of the Southern Dental Association are permanent members of this association, and entitled to all the privileges of the class to which they belonged, without further action; and the treasurer is hereby directed to transcribe their names upon the roll of membership of this association;" and further by the Standing Resolution 12 of the National Dental Association: "12. *Resolved*, That lists of the ex-presidents of the American Dental Association and of the Southern Dental Association shall be published annually in the Transactions of the National Dental Association, and that all members and officers hold the same relations to the National Dental Association that they did to the former associations," it seems that they were quite competent to resolve the Southern Association into the Southern Branch of the National. It was therefore a painful surprise to learn that in certain quarters the Southern Association is harshly criticised for resolving itself into a branch, this constitutional action being ascribed to insincerity and disloyal motives. The members of the Southern Association entered earnestly and heartily into the formation of the National Dental Association. The records show that the vote in favor of effecting the union was "unanimous and followed by shouts of approval," necessitating a call to order by the chair. Its action in resolving itself into a branch of the National Association was in compliance with a provision of the constitution. It is now proposed by certain parties to do away with the branch feature; it remains to be decided whether this shall or shall not be done, and when it shall be done, if done at all. The joint committee from the original associations evolved this plan, which met with no opposition from either association when the constitution was read, discussed, and adopted; the president of the National Association writes me that he is in favor of branches, which is further evidenced by his indorsement of the call for the formation of a branch in the division of the East. Individually, I am in favor of the National Association, and I am also in favor of the branches; and especially do I believe there is work to be done by the Southern Branch, work which will not injure the National, but which, on the contrary, will greatly strengthen it in the South. I am strongly opposed to annihilating the Southern Branch, especially so early in her career, before there has been an opportunity for demonstrating whether it will prove a help or a hindrance. The imputation that the adoption of Dr. Crawford's resolution was an evidence of disloyalty must be refuted, and it appeared to me that the surest way to disprove the charge was to strengthen the membership of the National in the South. To this end I have done a great deal of work, possibly more than I would have had energy to do had it not been for this additional inspiration to effort. I have worked hard to have delegates elected by the Southern State Societies, not only to the Southern Branch, as provided for in Section 6 of Article XIV of the constitution, but also to the coming meeting of the National Association, as per Section 1 of Article IV. I am still striving to attain this object, and am urging the members individually to attend this important meeting. If every year we put into office men who are not afraid of work, and doubly add to the membership of the National in the South by the annual election of the two sets of delegates provided for by the constitution as above, we shall give the National a membership so much stronger from the South than from any other division that the charge of disloyalty will be amply disproven, and there will cease to exist the slightest doubt as to the utility of the Southern Branch. If, on the other hand, we make no effort to prevent the elimination of the branch feature, the charge of disloyalty in forming the Southern Branch remains unrefuted, with no means of proving the uprightness and wisdom of our action except by words,—but "actions speak louder than words." While I am thus outspoken in my desire that the Southern Branch shall live, at least long enough to prove her usefulness to the profession, at the same time I do not wish to be an obstructionist, interposing even one man in the path of professional progress. When the Southern Branch shall have been given an opportunity to show her usefulness, and shall have failed to prove herself a benefit, then I am sure that we will all be willing to give her up—but of our own free will, when we shall have failed in our object in her formation, not in response to a demand from those who love us not. The reasons, therefore, why every man who can possibly do so should attend the first annual meeting of the National Association are (1) social and scientific advancement and the inspiration to progress resulting from such great gatherings, and also the recreation of which all stand in need; (2) the obligation to build up the National Association by lending our personal aid to make it what it should be; (3) the decision as to whether or not the "branch feature" shall be abolished. The presence of a large number from the South will be a strong argument in favor of the branch, and no one who can attend and does not do so can blame any one but himself for the result, be it what it may.

WM. ERNEST WALKER.

# PROCEEDINGS OF SOCIETIES.

## TRI-STATE DENTAL MEETING OF THE MICHIGAN, INDIANA, AND OHIO DENTAL ASSOCIATIONS.

MEETING held at Put-in Bay, June 21, 22, 23, 1898.

The meeting was called to order by Dr. Grant Molyneaux, president of the Ohio Association. The session was opened with prayer by Dr. J. Taft, of Cincinnati.

Dr. Molyneaux, after a brief opening address, introduced Dr. C. T. Loeffler, of Saginaw, Mich., as the presiding officer of the day, which he designated as "Michigan Day." After an appropriate response to the address of welcome, Dr. Loeffler introduced Dr. Hartman, president of the Indiana State Dental Society.

Dr. HARTMAN. There is instilled in the heart of every dentist a love of country and a love of liberty. A member of our Indiana State Dental Association, and the treasurer of the same, has gone to defend the flag of his country, and has sent us the following message: "Chickamauga National Park, Ga., June 21, 1898. To the President of the Tri-State Dental Association. Sincere greeting. May much enjoyment and benefit result to all. (Signed) Robert T. Oliver."

The CHAIRMAN. Suitable reply will be made to that.

Dr. ARNOLD, of Ohio, presented the following resolution:

> "Since it is a well-known fact that the defenders of our country are unprovided with the special branch of medical science whose function it is to care for the dental organs; and,
>
> "WHEREAS, It is essential for the welfare of the whole body that these organs be kept in a state of health and usefulness; therefore,
>
> "*Be it resolved*, That we, the State Dental Societies of Indiana, Michigan, and Ohio jointly, and in convention assembled at Put-in Bay, June 21, 1898, do hereby respectfully petition the Congress of the United States to enact such laws as will provide for the employment of dentists in the army and navy, by which much suffering and disability will be prevented, and the medical service as a whole rendered more efficient."

In explanation of the resolution he said,—

Mr. President, this resolution is introduced at this time because there is now, I understand, a bill presented in Congress for this purpose, and it was thought prudent to have this resolution adopted, if it be adopted at all, at this meeting, so that it may be sent on at once to Dr. Harlan, of Chicago, who will take charge of it further, and will transmit it to Washington. I therefore move you the adoption of this resolution.

The motion was duly seconded and was unanimously adopted.

The CHAIRMAN. We will now proceed to the regular program. Our first subject will be "The Personal Element in Practice," by Dr. Alexander Jameson, of Indianapolis.

Dr. JAMESON then read his paper, as follows:

## SUGGESTION AS A FACTOR IN CONTROLLING PATIENTS DURING DENTAL OPERATIONS.

In attempting to present the idea of mental control as a factor in quieting apprehension and relieving pain in dental operations, I find that I have entered into a field boundless in possibilities and one that would warrant years of study.

There are so many elements that enter into this combination that a classification of them is likely to be superficial unless it is the result of lifelong study. Not having all our lives to give to many things, we grasp the important points of others' life-work and use them in whatever combination best suits our purpose. We cannot all be artists to cause our fellow-creatures to linger in ecstasy in the presence of our work, and leave it better men and women for having seen it; nor poets to exalt their thoughts far up to the source and fountain-head of all thought; nor physicians with some of that healing touch that came from the Nazarene; nor original investigators to reap a reward long after we have gone to that other reward; nor wonderful artificers with ingenuity and deftness that makes beholders stare in wonder; nor hypnotists who by a few words can assume mental control of our fellow-man. But we can and do in a measure take from all of these, and this constitutes dentistry as it is known to-day. He who neglects any of these is not a full success; he who goes deeply into all of them is a guiding star to his brothers.

A history of hypnotism, mesmerism, or animal magnetism, call it what you may, presents a series of theories and observations that are at wide variance and are well calculated to fill the fair-minded man with distrust. But all through its history, though it may have been the instrument of charlatans and fakirs, there have been *results*, and these results were the cause for its investigation by scientific men, so that to-day it is no longer shrouded in mystery and darkness, but stands out a definite and tangible science, if you please, ready for our use if we choose to use it.

Hypnosis is of two degrees, the formal and informal. In the formal the hypnotist assumes complete mental control of the subject; in the informal there is a changeable degree of mental domination or influence.

This latter state prevails usually without the knowledge of the subject; it is generally called suggestion, and is one of the most potent factors in the easy management of nervous and apprehensive patients. We all strive to gain the confidence of our patients, but we do not gain it alone by the excellence of our work, for we have all seen cases where the earnest, honest operator had but a meager clientèle, and the indifferent operator in the same community had the cream of the practice and was always busy. The one had the gift, if I may put it so strongly, of producing informal hypnosis or undue influence; the other was devoid of it, but did not know what the trouble was. To bring the example nearer home, we have had patients who have come to us from other cities, or from some dentist no longer in practice, and who have always gauged our every movement by those of the former dentist. They would give us the impression that they did not hope for us to do our work in such an excellent manner as the former dentist had, when as a matter of fact our work was better in every way than the former work.

By these examples I do not mean to suggest that this power is to be used as a means to acquire practice, though that result would be a natural sequence of its legitimate use. We see cases too often where the abuse of this power by the dentist is so plain and apparent that it fills us with righteous indignation. The proper and legitimate use of suggestion by the dentist is in the treatment of his patients and controlling them so that he can treat them, and not in its use as a powerful glass to magnify the ego.

A brief description of the "Neuron motility hypothesis" will pave the way for further speculation in this matter, and I will attempt, though not a physiologist nor a psychologist, to relate the principal points thereof.

The nerve-cell and its attachments is the nerve unit, and is called the "neuron." This "neuron" is composed of three main parts,—the cell or body, the axon, and the tufted end of the axon. Also upon the cell body are to be found tree-like processes or dendrons, and slight elevations called gemmules.

Neurons are of two kinds, those that have long axons and those having axons that branch immediately on leaving the cell. Now, an impression is carried to the brain by three neurons and the impulse from the brain to the muscle by two, so that there is a system of relays,—the impression or motion is not continuous. The point of contact between one neuron and the next bears a resemblance to the anastomosis of the veins and the arteries through the capillaries, only that one is a relation of contact and the other of continuity. It is generally accepted that all impressions are carried by a wave-like or an undulatory force, and that this force causes an elongation of the terminal ends of the axon with consequent contact with the dendrons of the next neuron.

When we consider that there are some 3,000,000 neurons in the body, nearly half of which are in the brain, and each one, if not capable of contraction and expansion as a whole, has this power in its terminal filaments, we begin to realize what a delicate mechanism this is and how susceptible it must be to any stimulus or any impairment of function. The process of sleep is thus described by one authority: "A retraction of the processes in the areas of the brain controlling the senses and voluntary motion, whether arising from loss of cell-contents or voluntary relaxation, will produce unconsciousness or sleep. The neurons have become insulated so that mere impulses are not received or transmitted." Also, "By means of external stimulus a centripetal impulse from suggestion or auto-suggestion, or in consequence of the renewed supply of cell-contents, processes are protracted, those of the auditory usually acting first, and the man awakens." Catalepsy, that peculiar condition sometimes accompanying hypnotism, is explained by one author as being a constant contact instead of intermittent ones, as are most nerve impulses. Memory is explained by another authority as not being the result of any permanent structure in the cells of the brain responding to a like stimulus always, but as being the same combination of neurons caused by the same stimuli.

Hypnosis is defined as "an artificially induced nerve relaxation, usually characterized by increased impressibility." Hence it has been argued that there are fewer or no cross-currents of nerve rhythm or collateral impressions, so that a suggestion or stimulus is more acute, as it is not diffused, but carried through only the necessary neurons. The close dividing line between hypnosis and sleep is probably better described by Meacham, in his admirable work, than elsewhere. He gives several examples of cases to sustain his position and make it more clear. He says, "I meet a patient, place him in an easy-chair, talk soothingly but positively, using all possible mental suggestion, or volition, as the mesmerists call it. I fix his eyes while talking to him. He becomes absorbed in my words. His attention is given wholly to me. He gradually forgets the presence of others, recognizes no other sounds than my voice. In the lessened consciousness the condition is related to sleep, but when my words have caused a placebo to act as a specific might, a different element has entered, that of seemingly increased elasticity of the neurons, bodies, and processes. Fewer neurons have been affected than in sleep, for the patient has been steadily conscious of my personality, but unconscious of having experienced any abnormal conditions, though by manner, look, and thought I have produced informal hypnosis." . . . "I take another patient naturally more impressible than the former, tell him to relax himself, close his eyes, and think of sleep. Neuron after neuron becomes relaxed, processes more retracted than in any sleep, for in that they are usually not so much separated but that a sharp impetus will bring them into relation. Area after area follows my suggestion, becoming as deeply affected as I wish. He becomes conscious of nothing but my voice (and thought). In sleep he might dream, but now even that is denied him, save with my consent. At my suggestion, however, almost any former combination may be called into existence. Those seemingly forgotten, perhaps never recognized, become fresh and vigorous. He may pass even to a stage where my voice has no power to awaken him, for I have seen subjects that would awake only upon a mental suggestion. Nerve areas are affected, then, in sleep, for involuntary mental activity and reflex action are suspended. The great difference between the hypnotic state and wakefulness or sleep is the marked increase of process pliability, in the ease and celerity with which changes are produced, and the vigor of the combinations that appear in response to suggestion. Sleep is a condition of neuron plasticity. Hypnosis is a state of neuron elasticity, marked by ready reaction in certain areas, while sleep is characterized by lack of reaction to moderate stimulus in most areas."

The same author has, in speaking of a state of relaxation or impressibility as opposed to mental activity, made a very strong and clear difference when he says, "The mind in activity may be compared to a tangled mass of various colored silks from which it is desired to form a beautiful design in embroidery. The mind at rest is represented by the same silks separated, neatly wound, arranged in order of colors, ready for the artist's hand."

A recognition of the classes or kinds of people who are most susceptible to hypnotic influence would naturally suggest itself to the one who desires to be successful in the largest measure. The term "neurotic" is used to describe the disposition or temperament that is most easily affected. The short-eared, bullet-headed man is in no way fitted for a subject. On the contrary, the neurotic is described as an individual who has a large, well-developed head, full forehead, large dreamy eyes, far apart, with high, arched brows, fine hair and soft skin, delicate, and with hands liable to perspire. In disposition he is imaginative, impulsive, easy to coax but hard to drive, quick to perceive, but with an indifferent memory. One who embellishes, but is seldom if ever a vicious liar. It is to this class that the painters, poets, and musicians belong. They are capable of enthusiasm or depression, quick to be offended and quick to forget the offense. They are not the plodders, but the brilliant individuals. From this class also come the best hypnotists.

It is generally conceded that thought-waves are a means of transference of ideas to a greater or less extent. A vigorous thinker is capable of producing stronger or more active rhythms than the moderate or deep thinker. There is no limit to such waves, provided there be a delicate elastic and relaxed brain to receive them. The best hypnotist, then, is he who is capable of vigorous thought, and as a rule he who is strong and healthy. But this does not mean, nor is it conceded by the best authority, that the hypnotist is necessarily a mental superior in any way to the subject; he may be different mentally, but the difference is possibly in the matter of training in some one direction. Thus we see that the influence to be exerted in this way is not wholly the result of oral suggestion, but of mental suggestion as well. We must not only tell our patients a certain fact, but we ourselves must be in an exalted, not a sluggish frame of mind.

We see examples of the vigorous thinker in the orator who inspires us, not so much by what he says as in the way he says it. He has the fire, the enthusiasm, which is contagious, and by having an audience which is in touch with him the thought-waves are intensified as they go from one to another. So that the intense or vigorous thought or action, with all things being equal, register a more profound result on the relaxed or sensitive neurons of our patient. As an example of this, patients seldom doubt the ability of a dentist who has no doubt of his own ability; or, in other words, a vigorous, intense appreciation of one's own ability will influence others in the same belief. I would not recommend that this idea went further than a mental suggestion, however, as the ultimate effects might be different from those we most desire.

The rules for producing formal hypnosis differ only in degree from those used to produce informal hypnosis. Mental force or will force is probably the first and most important; next, but as a consequence of this, correct verbal phraseology is essential. It is recommended that the muscles of the shoulders, arms, and neck be made rigid, thus preventing the return flow of blood from the brain, making more cerebral activity. As we are dealing with informal rather than formal hypnosis, a description of the methods for producing formal hypnosis would not naturally fall under the scope of this paper. A few instances of the power of suggestion upon our patients will illustrate sufficiently its place as an aid to us and our patients.

That many of you have used this means to accomplish results is doubtless the case. We all know that a great percentage of dental operations are painless, and we have patients who tell us that it is the dread of the thing more than the actual pain which makes them put off the necessary visits. Some will say they will stand all the pain we can inflict if we will only promise not to use the dental engine. With such patients—and there are many of them—I proceed as follows: After making an examination and familiarizing myself with the nature of the work to be performed, I see that they are sitting comfortably in the chair, and I seat myself with deliberation so that they may see me without effort. The first suggestion I give them is that I have all the rest of my natural life in which to do their work; then I go into a detailed explanation of each cavity to be filled, and make them understand clearly and without doubt that the amount of actual pain I will inflict in the whole series of operations will be something insignificant. I impress them deeply that I am complete master of each instrument I use, and that I have a complete knowledge of the anatomy of the tooth to be operated upon; that each motion is to be made with the precision of machinery, and always with the thought that I am going to avoid inflicting pain as carefully as though I were cutting at my own tooth. I also give them the assurance that if there is to be a sensitive place which may pain them, I will tell them before I begin work upon it, and then when I reach the point that is sensitive I will stop on the slightest sign from them. If I have occasion to do any work at this sitting, I naturally perform that operation which will be attended with the least pain to the patient, but do not tell my patient that it is less painful than other operations which are to follow. The first operation should be a short one, so that the patient will not become exhausted from long sitting, then gradually as the work progresses the larger and more difficult operations may be performed. I give this method of procedure as an example of informal hypnosis. Each suggestion given, if based upon the probabilities of the work, will strengthen following suggestions and lead your patient to rely on your judgment, and will make what ordinarily would be a nerve-racking case for both yourself and patient one that is easy of accomplishment. The words of one patient, a nervous, irritable woman, who had been treated in this manner, I recall because they aptly illustrate the results. She said, "About the time I have learned not to dread having my teeth filled, I find I have no more to fill."

I will not dwell longer on the personal application of the principles here set forth, as all cases are to be handled according to their own individuality, but I will give to you a thought that was given to me by Leslie T. Meacham, to whom more than to any one else I am indebted for the essential features of this paper. He says, "Suggest to the hyperesthetic patient that his condition is caused by hyperemia; that if he will relax himself and rotate his head it will cause the blood to flow back into the body and relieve his condition. This process is the opposite of that for increasing personal magnetism, and properly presented to the patient has accomplished some brilliant results."

My idea in presenting this subject to a scientific body is that all things which are scientific are of especial interest to us when they may play an important part in our life-work. We are at all times searching for ideas and appliances that make our work easier and better. This is characteristic of the dentist, but we are not taking up ideas that are recommended to us without reason. Hence I have dwelt especially on the scientific side of this subject, and relegated the personal part to the background. I know that you have all had personal experiences in this special line, some puzzling, no doubt, some amusing. Instances of complete anesthesia from cataphoresis even where a cord of the apparatus was broken or disconnected come under this head, as do vague toothaches which we actually explain away and cure by remedies no more capable of a definite result than some drug of the thirtieth potency.

If there are but a few present who have been interested in this subject enough to take further steps in this direction, my object on this occasion will be fulfilled, for I am sure they will find that the field is one of wonderful interest and possibly of ultimate profit to themselves and their patients.

Chairman LOEFFLER. The discussion of this subject will now be opened by Dr. C. B. Blackmarr, of Jackson, Michigan.

Dr. BLACKMARR read from the *Journal of Practical Hypnotism* a description of two practical cases in dentistry showing the power of suggestion, and continuing, said,—

I think we all try to put our patients into that state called "informal hypnosis" by Dr. Jameson every time we try to influence them. There certainly is a right way and a wrong way to use hypnotism, and if it is a fact that by suggestion we can lessen pain —and I think we can—the quicker we know more about hypnotism the better.

Medical statistics say that in a record of ten hundred and four persons twenty-seven could not be hypnotized, three hundred and thirty-five were made sleepy only, while six hundred and forty-two passed into a complete hypnotic state. Frequent hypnotic influence is dangerous to the health of animals. Six hens daily hypnotized acquired nervous derangements, and died without exception in the course of some weeks. We can draw inferences from the above in using hypnotism on human subjects. I believe that any general anesthetic, like ether, chloroform, hypnotism, etc., had better be given by the physician in his office rather than by the dentist, because if anything untoward happens to the patient it is not in the dentist's office, but in the physician's, whose patient he is.

Patients who want to be controlled are easily helped by hypnotic suggestion. Some patients will not admit that the practitioner has any better judgment than they have themselves. It takes two to make a bargain. They want to hypnotize the dentist. It is a fact that certain leaders of men with ability and will-power can control great masses of people in their thoughts upon certain subjects. Every good orator, in a sense, hypnotizes his audience. A dentist can use this same influence with his patients. He can by suggestion control their pain, fears, superstitions, ignorance, disagreeable moods and thoughts, provided the patient is willing to be controlled. I think a patient should, after deciding on a certain dentist, be willing to be controlled by that dentist while his patient and in his office, because if a dentist cannot maintain the individuality of his office his influence is gone. If the dentist cannot control the patient harmoniously, it is better for the patient to go or be sent to some one who can. To the successful suggestive therapeutist I would say,—

> "The paths of pain are thine; go forth
> With feeling and with hope.
> The suffering of a sin-sick earth
> Shall give thee ample scope."

Chairman LOEFFLER. The subject before us is now open for general discussion.

Dr. PARKER, of Grand Rapids. I think we have never had a better illustration of the power of suggestion than that given us by the two who have just spoken. If you will analyze your own feelings for a moment you will see that it is so. When Dr. Jameson sat down you were imbued with a sense of philosophical feeling on the subject; Dr. Blackmarr came in, and with his light, airy way of treating the subject has made it all very funny to you. He has suggested the funny side of the thing, and you see it only in that direction now. The philosophical side of the subject you saw from Dr. Jameson's paper. Now, along this line I have had some experience. I am not a hypnotist in any sense of the word, but it has been a favorite study of mine for a long time; and my thought upon the matter has reached this point, that if I were called upon to give a new definition for the genus homo, I would say that man is an animal that suggests. He is the only animal that I know of that suggests, and he always does it. Every orator, as has been said here to-day, suggests. Every singer suggests, every artist suggests, and the whole progress of life is suggestion all the way through. That it can be made to control pain, it seems to me, goes without saying. It certainly does to any dentist who has practiced it or thought it along those lines, and as Dr. Jameson said in his article here, and his methods that were laid down—by Dr. Meacham—that you suggest to the patient that it is going to hurt, and you will hurt. Take, for instance, the dental engine, which is the terror of almost all. My method is a little different perhaps from some others. I simply say to the patient, "Now, this instrument is a tool in my hands; if it hurts at all I do the hurting; it is not the instrument. It is just as harmless in its action as the excavator. Only you have got an idea in your mind that it is a machine and the machine hasn't any soul, and it will go right on and hurt you. Of course, you know from your experience in connection with machinery that if you get into machinery it is going to tear you to pieces. It has no soul, no feeling, no sentiment. Now, this is not a machine in that sense. It is an instrument in my hands, and I am going to use it judiciously, and it won't hurt you any more than the excavator will." And so as far as possible I illustrate it. I use a little deception; I put the bur on the enamel and the excavator on the sensitive dentin, and just as soon as they understand it is that, and get thoroughly hold of the idea that you can operate that engine just as well as you can the excavator, they are calmed at once.

Now, along the line of suggestion, and the necessity that the patient should be brought up to understand what is to be done, I have given an illustration. Some ten years ago nearly I had for a patient a very intelligent woman. She was teaching drawing in our public schools. She had been practicing for quite a while what was the fad then known as mind-reading. She had become very sensitive, and would do extraordinary things. When she came to me at one time for an operation she had an exceedingly sensitive tooth. It was a lower molar, and she said, "Doctor, don't you suppose you could hypnotize me and help me out of this?" I answered, "Why, if you can place yourself in just the position you did at a certain time when I was present at one of those séances of mind-reading, I can do it readily enough." I said, "Can you do that?" "Certainly," she said, "I can do that." It was what might be called auto-suggestion. She had brought herself in that condition in which she goes to sleep. I said to her, "Go to sleep; you are down at the park; here is a hammock, and here is a book, and it is a delightful story; just read this book." She dozed off in a quiet way into a sound sleep, and I went to work and excavated the cavity for a filling of gold. I think I was an hour and a half in doing it. Then I said, "All right," and she woke and started up, and I said, "Well, where have you been?" And she replied, "I have been having a nice time, doctor; I thought I was down at the park, lying in a hammock and reading." I asked her what she was reading about, and she said, "Why, I don't recall what it was." I said to her, "Can't you recollect any incident in it?" "No, not a thing, only I know it was just delightful." That is the most marked case I ever had. I never had another patient that I felt I could control in that way.

Dr. W. C. BARRETT, of Buffalo. Mr. President, Gentlemen,—Ever since the time when the Witch of Endor had designs on the King of Israel, and made him believe he was in conversation with the celebrated prophet whom he revered so much, down to the time of the latest exhibition of hypnotism upon the stage in which hired servants are made to perform all sorts of queer tricks, there have been constant manifestations of the neurotic disposition and neurotic character. I believe that all these things belong to the same general class,—that is, they belong to a something in mental organization which we cannot fully explain; but that these things have yet been reduced to a law, or that they are likely to be reduced to a law, I am very loath to accept. I do not believe in any of the stories that have been told by the advertising quacks, whether medical or dental, who have published articles and sent them out broadcast for advertising purposes. Now, it is quite probable my mind is so constructed that I am incapable of conceiving or having a clear comprehension of these mysterious matters which no man seems to comprehend. I remember five years ago, at the time of the Chicago meeting, a noted dentist, a man of high attainments, made the prediction that within five years every dental office that was worthy of the name, every dentist who was worthy to practice dentistry, would be using hypnotism in his daily practice. I do not know but every dentist worthy to practice dentistry is doing it now, but if so I am one of the unworthy ones. Now, from the time of these early manifestations down through all the manifestations of this mysterious nerve force to the present time, all the names which it has been called by, all have the same generic origin. I call to mind certain names by which it has been known,—viz, animal magnetism, mesmerism, second sight, spiritualism, clairvoyance, mental philosophy, psychology, catalepsy, hysteria, neurosis, mind-reading, Christian science in many of its manifestations, and the curing of disease by the laying on of hands. All belong to the same generic class, and have the same general origin. I know of many cases in which the practice of hypnotism has wrought most serious injury to the patients. I believe, and I think the time must come when this will be absolutely forbidden by law, and I think that that time, if it should come to-morrow, would make the world better and dentistry would stand on a higher plane. It would no longer depend upon all these imaginary things; but that each one of us would use the hypnotic power of kindness, of gentleness, of delicacy, of sympathy with suffering humanity, and not attempt by some kind of imaginary power or hocus-pocus business to control it, instead of doing it by the means which are natural, and with which every dentist should certainly be equipped.

Dr. HUNT, of Indianapolis. Mr. President,—I think it is perhaps a little unfortunate that the word hypnotism was uttered at all here this afternoon. The word is so connected in our minds with charlatans and with quacks and with men who, as Dr. Barrett has said, hire some one to perform antics for them when they give these exhibitions, that it is a little difficult for us to dissociate our minds from that class of people. Now, in my opinion, and I do not know anything about hypnotism,—that is, the putting of a person to sleep,—except such as I have seen, and whether they were genuine cases or not I cannot say, I am firmly convinced that there is a great deal in suggestion. Dr. Barrett says he does not use hypnotism. I do not believe he does, but I do believe that Dr. Barrett uses suggestion, and that the suggestion which he uses is the first step toward the hypnotic state. I do not believe that any dentist who can handle his patients at all can get along without using suggestion. Dr. Barrett calls it kindness, sympathy, and that is a good name for it, but that is suggestion just the same. If he cannot impress his patients with the idea he is not going to hurt them he will hurt a great many more of them than he does now, because I know he does impress them with the idea he is not going to hurt them. And if you impress them with that idea, you are using the first step of hypnotism. Now, the hypnotists of to-day, those who are not born charlatans, do not claim there is any special power in them. They do not claim they have any supernatural power, or that they have any extraordinary amount of animal magnetism that passes from them to the patient. They simply claim that if the patient will put himself in a perfectly responsive mood, the patient performs the operation, not they. They are simply the agent which the patient uses to obtund his nervous sensibility; that they do not claim to have any power at all any more than you and I have, but they do claim that by practice they have learned how best to perform this operation or this act, whatever you may call it. And the fact that it is dangerous for a man to practice hypnotism, pure and simple,—that is, put a patient to sleep entirely from under his own volition,—is undoubtedly true, and even the best hypnotists, that is, the men who have been scientific in their pursuits, will tell you that it is dangerous for the novice to do, that the novice ought never to attempt it, that the novice may cause incalculable harm to the patient. But that they can do it, and that you can do it, or any one can do it after having learned how, is pretty well proven. I do not believe you can destroy sensibility in any one without a chance of harm befalling them, but the chance of harm is very much reduced, and is very small indeed. However, what I want to say is, I do not believe the essayist ever intended that you or I or he should practice hypnotism such as Dr. Barrett is talking about; but what he does mean is that the first step of it, what is known as suggestion, should be cultivated. You do not need to call it hypnotism, or even suggestion; you may call it the impression of your will-power upon the patient. That is what it is. You all do it in spite of Dr. Barrett.

A VOICE. Sympathy.

Dr. HUNT. Yes, it is sympathy. That is what it is. If you will impress them with the idea that you are not going to hurt any more than you can help, and what little hurt you do them will not be severe at all; if you can gain their confidence in that way you have practiced suggestion. I believe that a little suggestion on the part of the dentist goes a long way toward allowing you to perform certain operations which, without the suggestion, would be very painful.

Dr. HARTZELL, of Minneapolis. I have been very much pleased with both the paper and the discussion, and particularly the attitude of Dr. Barrett. I have had the opportunity of noticing exhibitions of this wonderful force that we have in ourselves to control ourselves and others, and I regret that it has been termed hypnotism. Suggestion is the true name for that power which we dentists should encourage in our patients and in ourselves. It is a recognized fact by the whole commercial world that suggestion is one of the most wonderful influences that we can observe in doing the ordinary business of life. You can take, for instance, the child as soon as it is born. If the mother says, "Well, Charley is very bashful; he does not make up with strangers," that child will hide behind the mother's skirts, and he will always be a bashful, diffident infant. And even as he grows older that same characteristic will obtain. If, on the other hand, with that same child, if she says, "Well, my children make up with strangers very easily, very readily," that child in a few moments is playing with you and talking to you, and telling you of its interests. The merchant recognizes it. You walk down the streets of any of these large cities and you will find they are tearing out all the stone fronts and putting in new large plate-glass windows and displaying the wares they have to sell in the most public and suggestive manner. That is suggestion. You pass along the street and you look in, and you see a fine suit of clothes, and you say, I will go in and buy one. It is suggested to you that it is a good thing to do. The man who sells coffee in your streets recognizes the same fact, and he places coffee over a burning lamp that the pleasant aroma of the fine coffee can float out on the atmosphere as you go home at night. You say, "That is pretty good; I will step in and buy a pound." That is suggestion in its most practical form. I have had the opportunity of observing the manipulation of one or two men who have disturbed the calm atmosphere of state ethics in the past three years in the Northwest, and while entirely out of sympathy with these men in what they taught, I am a firm believer that suggestion practically handled in the hands of the dentist is one of the most useful elements that we can employ in controlling our patients. Not hypnotism, but suggestion.

Dr. H. A. SMITH, of Cincinnati. The remarks of the last gentleman, and especially the remarks of Dr. Barrett, remind me that some twenty years ago or more we had a school of dentists that taught the doctrine that if you hurt the patient, dismiss that patient at once,—dismiss him to some one who would not hurt him. Their theory was that the patient was incompatible with you as an operator, therefore you must not proceed. Dr. Taft was a member of that church. I will not detain you except to make a statement that Dr. Atkinson made once. He might perhaps have made more, but I recall his making this. He said, "If you hurt a patient you are only praying with your little finger; pray with all your fingers and thumbs and you will not hurt." Then, it may be prayer instead of sympathy or hypnotism, but suggestion is a very good word. Unconsciously we do control our patients; not only pray with all our fingers, but by suggestion or will-power. It is dangerous to call it hypnotism. I have had some experience with professional hypnotists; I have removed on two occasions a vital pulp under this influence without a particle of pain to the patient.

Dr. SWEETMAN, of Minnesota. I have practiced hypnotism in dentistry. The gentleman who last spoke has said he extracted a live pulp where he was not the hypnotist. I have hypnotized patients and taken live pulps out of every tooth without hurting them. I have extracted whole sets of teeth under the influence of hypnotism, and I have hypnotized patients to have surgical operations performed upon them by a physician in the same block with me. Three or four years ago I gave it up, because of the very same thing that we see here to-day in this assembly. There is a deep-seated prejudice against something we do not nor cannot reduce to an exact science, and for that reason I have abandoned it.

As soon as a man lets it become known people commence to talk about that, and it works to a man's detriment. While I have induced that state or condition, I did it in ignorance. I don't know anything more about it than any one else present. I know it is a matter of suggestion. You can carry a person on where you can do those things and not hurt them. You don't know how it is done, and I did not know how it was done during the entire time I did it. I have stopped the practice of it for the reasons I have stated.

Dr. TAFT, Cincinnati. I have nothing to add on this subject. You all know as much about it as I do. There is not a very great difference of opinion among the different members of the profession in regard to it. Those who have looked into it and investigated it have come to the conclusion that it is a matter beyond their ken, as the last speaker said. They do not know how it is accomplished, nor can they control it. Certain results are obtained in certain cases, and in other instances it is resisted altogether. Who is responsible for that, whether the operator or the subject, is, of course, an open question. I do not understand that I am in the category, or ever have been, that Dr. Smith referred to a little while ago. I have never publicly indulged in the practice he mentioned for this purpose. Dr. Atkinson was exceedingly various at different times of his life in the things he evolved and the things which he proposed and suggested and practiced. He was trying all these things, and perhaps held fast to those which he found to be good, but he never attained more in this particular than other people have. It is, you all know, true that some men possess a power of influencing other persons that is not possessed by others. It is, as it seems to me, mainly a difference in names. Dr. Barrett would attain a condition of his patient that would render an operation comparatively painless—he does not claim entirely painless—by sympathetic influence, a power over them by sympathy and kindness and gentleness, and we all know that if a person is treated in certain ways he will make far less manifestation of pain than under other circumstances. Upon what that depends we cannot decide, of course. Some of these experiments that are made seem to prove facts, or show beyond any ability to prove the contrary that there is absolutely by these processes immunity from pain secured. But it is not sufficiently available, not sufficiently practical to warrant it as a general practice. Even those who have gone into it most, and, as the last speaker intimated, those who have done most in it, become by and by more and more cautious, until it is wholly abandoned. That is in almost every instance the case with those who are in earnest and desire to obtain the knowledge that attaches to it,—it results in their abandonment of it. The charlatans will use it as long as they can make money. I do verily believe, however, that in the personal influence of one person over another,—and there is a very great difference in that respect,—I believe it is perfectly competent and right for any one to influence his patients just as far as he can for their good, for their benefit. That is your idea, I think, too. Whether it is by sympathy or by some unnamed influence,—perhaps there may be a question upon which there is a difference of opinion. But that we can all place our patients in better conditions than is sometimes done, I think there is no question. And it ought to be a subject of thought with every one, What can I do to mitigate pain and suffering that is constant and connected with operations upon the teeth and in the mouth, the most sensitive part of the entire organism? But this matter of common hypnotism I have very little sympathy with, and very little confidence as to its general utility or general practicability.

Dr. JAMESON. I have nothing more to say on the subject, only that it was my idea to use strictly the term suggestion as meaning suggestion and not hypnotism. I did not want to be misunderstood on that, and I do not think there was any point of the paper that could have been misunderstood. I would recommend that a study of this subject, according to the most recent literature, does throw vastly more light on the subject in a scientific way than has been popularly supposed.

(To be continued.)

## AMERICAN MEDICAL ASSOCIATION—SECTION ON STOMATOLOGY.

THE fifty-first annual meeting of the American Medical Association was held in Denver, Col., June 7-10, 1898.

The Section on Stomatology held its sessions in Odd Fellows' Hall. The Colorado State Dental Association held its annual meeting at the same time and place, the state association having charge of the morning sessions, which were chiefly devoted to clinics and the business of the society.

### FIRST DAY—*Morning Session.*

Dr. W. K. SINTON, of Colorado Springs, president of the Colorado State Dental Association, delivered an address to the state society and welcomed the visiting members of the American Medical Association to Denver. The session was opened by prayer by the Rev. Frederick W. Oates, of Denver.

Routine business occupied the remainder of the session, and adjournment was had till 2 P.M.

### *Afternoon Session.*

Dr. G. V. I. BROWN, of Milwaukee, chairman of the Section, read his annual address, an abstract of which follows:

It is my pleasure, as your chairman, to give the first greeting to the Section of Stomatology of this association, and also to our *confrères* in joint session, the Colorado dentists, among whom I trust it may be but the inaugural of long and beneficial intercourse. Stomatologists in fact we have long been, I am sure, but to be so recognized by title is a long step forward in the direction toward which, from year to year, those who have carried the burden of the vast amount of work necessary to this Section have labored, and is certainly worthy of general congratulation. We no longer serve under the somewhat limited, almost ambiguous, term of oral surgeons, but are hereafter to be recognized as those having understanding of the science of the mouth, a tribute complimentary to the scientific character of papers which, published side by side in the *Journal* of this association with the essays of the most learned medical and surgical lights of the day, have gained the respect of the other branches, having given those who treat diseases of the mouth their only opportunity to exchange ideas directly with the medical world, the influence of which, in discovering to it the possibilities of applying the technique of the skillful dentist, in conjunction with a knowledge also of surgical procedure and medical science, cannot be overestimated.

The address of your chairman, Dr. Andrews, last year, in following out the idea of an anniversary celebration, has told the story of the earnest few, the authors of our being, so completely that reference to the history of the Section is unnecessary. It seems, however, that his suggestion as to the necessity for united efforts being made, in the interest of sanitation, in having the mouths of school-children regularly examined by capable practitioners of dentistry, and, in a general way, instruction given as to the care they ought to receive, is worthy of reiteration, in order that the idea may not escape entirely. An effort made in my own home during the past year toward carrying out the plan has not proven, thus far, of any great practical value, but constant agitation and repeated effort will undoubtedly accomplish in time much that is at first impossible. There is another line of duty to which I would respectfully call your attention, which also calls for united effort, in order that our objects may be furthered.

As we all understand, the essential idea of this Section is that dentists shall also be graduates in medicine, therefore properly entitled to the benefits accruing from association and consultation with physicians. There is a difference of opinion as to the advisability of having the student take the medical degree first and the special degree in dental surgery afterward, or *vice versa;* but there can be no question as to the importance and little, if any, of the necessity of having both; but, unfortunately for this desideratum, the difficulty of accomplishment, owing to lengthening of the required course of instruction for recognition by the National Association of Medical College Faculties and the National Association of Dental Faculties, while with each it is a mark of progress toward higher education, yet the probable effect, so far as the Section of Stomatology is concerned, and the advance of both professions into that interlying field fast becoming of value to each, is most unfavorable, and bids fair to completely abort, or at least inhibit, a promising growth in future usefulness, simply because the number of years of study required is becoming not only quite beyond the possibility of the average student to attend, but more extensive than the benefits to be derived from the practice of our special branch will warrant, in comparison with other departments of medical science. Therefore, the natural result will be that the student of the near future must decide either to be a dentist pure and simple, without a degree in general medicine, or be obliged to become an oculist, an aurist, a rhinologist, or a practitioner limited to some one or more of the other special fields of medicine, for which he can equip himself with one year, or perhaps a little more, study, after graduating at some medical college; and even if he takes a short post-graduate course abroad, as so many do, will yet have perhaps expended less time and money than would be required to complete his attendance at a reputable dental school.

When this Section was first organized and recognized by the American Medical Association it was possible to complete the required course for the degree Doctor of Dental Surgery in two years, then get an advanced standing in the medical college and receive a degree Doctor of Medicine in one year afterward. To-day the National Association of Medical Colleges requires four years' preparation for graduation and the Dental Faculty Association three years, with the prospect of an additional year in the near future now under consideration; it has already become a matter of some difficulty for a graduate of either school to be allowed advanced standing of even one year in the other, so that under the most favorable circumstances it requires five years' study to acquire both degrees at the present time, with every likelihood of the sixth year being added. Thus it seems not altogether improbable that, without proper adjustment of the difficulty, the Section of Stomatology might almost become limited in its active usefulness to the lives of present members.

I believe the good work done by this Section already, and the far-reaching benefits resulting from the great advance due to the understanding of the nature and treatment of diseases of the mouth, applied in a scientific manner, by association with other departments of medicine, have established the fact beyond the peradventure of a doubt that, from a clinical and scientific standpoint, it has earned the right to urge upon each side that an effort be made to further the protection of future influence by modifying for the purpose, in a reasonable manner, the exacting requirements upon those who desire to be fully equipped with both degrees.

To take the medical graduate in one year through the necessary technique of operations upon the teeth, in order that he may become an accomplished operator in that short time, is almost impossible. To require students of the dental college to take a full course in anatomy, physiology, chemistry, and all the fundamental branches, the same as medical students, has been proven to be, for the average individual, quite too much, in addition to his mechanical instruction, having a tendency to cause neglect of the latter; but in dental schools that are connected with medical colleges and universities it is always possible for a student willing to make unusual effort to take the regular course with the medical student, and at the same time fulfill the requirements of his dental studies and laboratory work. For such the reward and encouragement should be that, having passed the same examinations with an average equally as high as his medical brother, he will receive credit for those branches and be exempt from future examinations, so far as they are concerned, when he undertakes the study of medicine; also that the dental student so educated shall receive some mark of distinction in his degree, perhaps *cum laude*, which will serve to note the difference in his favor over other graduates in dentistry; and that the holder of such a degree be allowed to finish his course of medicine in at most two additional years. On the other hand, medical students at colleges where both branches are taught may avail themselves of the opportunity to do required work under the instructions in dental operative and prosthetic technics, and, having done so, be admitted to the senior year of a dental class, with credit allowed them for this work done, even though it had been done while a matriculate in the school of medicine. Such an arrangement would in no wise tend to let down the bars in either profession, and would without doubt encourage many students to make this effort, the enviable result of which would be more fully educated men and a greater number brought up directly in line with the purpose of this Section.

The bibliography of the past year, in its valuable additions to science from members of our profession, particularly of this Section, invites discussion in a most alluring manner, were time and a limit of your patience sufficient, but, in order that all may not escape, and because of special interest to myself as bearing upon a subject the clinical aspect of which has for some time been the object of my own investigation, I desire to call attention to the photographs of microscopical sections recently shown by Dr. J. Leon Williams, of London, in line with others by Talbot and statements by Black, demonstrating that the blood and nerve supply of the peridental membrane of the tooth is something quite different from that which is depicted in the illustrations of Gray and other anatomical authorities, clearly showing as they do nerve-filaments and nerve-fibers communicating directly with the peridental membrane of the tooth from the main nerve supply, a most important clinical consideration. Last year before this Section, in my paper upon the "Hyperkinesis of the Muscles of Mastication," I endeavored to call attention to the fact that tooth-grinding or extreme pressure of the jaws, caused by irritation of the nerve centers controlling those muscles, was a common etiological factor intimately associated with neuralgia of the trigeminus and other pains of the head, particularly in those forms of headache which are the accompaniment of neurasthenic conditions. Since the writing of the paper referred to a number of very interesting cases have come under my charge, in which the character of the pain had been mistaken for reflex of uterine diseases, and for which there had been one or more operations performed in the hope of relief, but without success, which in every case was afforded by correction of the source of irritation, discovered to be in the mouth. In one case there was evident a condition such as might be attributed to what is known as eye-strain, and I desire to introduce at this time the expression jaw-strain, as applied to a similar general condition resulting from an irritable weakness of the nerve centers controlling the muscles of mastication and the trigeminal branches directly affected, which, without going into more minute explanations, are easily accounted for by an examination of the photo-micrographs referred to; since through the peridental membrane we have as direct a connection with the main nerve supply as had long been supposed to be through the apical foramen of the pulp of the tooth only, and through tooth-grinding could have produced an equivalent condition to that of eye-strain, which several writers claim to be the cause of at least fifty per cent. of all cases of hystero-epilepsy and other disorders of nervous origin.

Full of hope, strong in the faith that the list of essays before us, to which, in closing, I invite your attention, will add its mite to benefit mankind in the alleviation of suffering, and filled with a deep sense of our several obligations, I thank you for your courteous attention and the honor of addressing you in my present capacity.

### *Discussion.*

Dr. A. E. BALDWIN, Chicago, said that the subject of the time and labor spent in acquiring the two degrees of D.D.S. and M.D. was a very serious one, but it was generally felt that every practitioner of dentistry should have the medical degree, and that the colleges should make it accessible without exacting unnecessary time. There may be differences of opinion as to the necessity on the dentist's part of the thorough knowledge of the medical branches, as chemistry, pathology, anatomy, etc., essential to the physician, but there can be no doubt that a knowledge of the principles of these studies is essential.

Dr. J. TAFT, Cincinnati, said there are so many phases of this question that he scarcely knew what to speak on. There is a disposition in most of the dental colleges to make the curriculum more thorough than it has ever been before, and dental students being educated now will have a broader view of anatomy, a broader knowledge of physiology, of pathology, and therapeutics than those of former years. How far it is practicable to advance is a question. Some think we should be as thorough in the dental school with these branches as in the medical school, and there is good reason why we should. The conditions dentists are called upon to treat are governed by the same laws as similar diseases in other regions of the body, and must be treated with reference to the same principles. These principles must then be understood by the dentist as thoroughly as by specialists in other organs. In regard to the special region covered by his practice, the thoroughness of the dentist's knowledge must be insisted on.

Dr. E. S. TALBOT, Chicago, said it was unfortunate if the practitioner had to start with the education for a specialty. Every student should have to begin with, first, a liberal general education, then if it were possible to get a medical education an ideal condition presents to build on this broad foundation the special knowledge needed. In general medical practice it is considered that to know the cause is half the battle in dealing with disease, and when a disease is known to be of microbic origin the knowledge will guide the treatment to success; yet in dentistry Dr. Miller showed that caries of the teeth was caused by microbes, and it is doubtful whether this knowledge has resulted in any better methods than those in practice previously.

Dr. W. K. SINTON thought that the point we should make clear in the discussion was that it did not make any difference whether we got the needed knowledge in the dental school or whether we got the medical degree; the necessity was that we get the knowledge, and how or when we got it made no difference. The advance in the dental schools was to a great extent supplying the want, and he thought that in the near future the question would be settled by their action.

Dr. J. S. MARSHALL, of Chicago, was glad that the Section had adopted the name of "Section on Stomatology," as indicating more truly the field of practice than "Dental Surgery." The knowledge of the principles of both medicine and surgery is required for the successful treatment of the common disease alveolar pyorrhea, and one who has not the knowledge will soon get into deep water. He had found that out when he began to practice, and in consequence he took a medical course. He did not take one of the easy courses, either, but selected one of the few medical colleges which at that time required three full years of nine months each. When he had gotten through this course he did not feel that he knew much, and he has been studying ever since, and expected to study as long as he was in practice. The day has passed when we can be content to be the tail end of the medical profession. We must be qualified in the very highest degree for the practice of our specialty if we expect to succeed, and we will find that the qualifications will pay us in every way, in dollars and cents as well as in the proud consciousness of being thoroughly equipped to do that which we profess to do.

Dr. G. V. I. BROWN said that the dental and medical schools should adopt such a course as would enable the student to acquire both degrees without unnecessary expense of time. If this were done more students would get both degrees, and the standing of the profession would be raised.

(To be continued.)

## DENTAL SOCIETY OF THE STATE OF NEW YORK.

THE annual meeting of the Dental Society of the State of New York was held at Albany, May 11 and 12, 1898.

Dr. R. OTTOLENGUI presented the following report as Correspondent of the society:

### PROSTHETIC DENTISTRY.

Mr. President and Gentlemen,—As a foundation for the report required of your Correspondent, the following letter was sent to the professors of prosthetic dentistry in all the colleges:

"My dear Doctor:

"As Correspondent of the New York State Dental Society, it becomes my duty each year to correspond with prominent members of the dental profession on some matters of common interest to the whole profession, and from their replies to compile a report which is delivered at the annual meeting.

"I am sending the following questions to the professors of prosthetic dentistry in various colleges, and I shall be much indebted if you will contribute to the symposium by giving me a reply:

"1—How would you make an exact duplicate of a full denture in the absence of the patient?

"2—Will you describe what you consider the best clasp for retaining partial dentures made on metal base, and give in detail method of making the same and attaching to the plate?"

Only a few sent replies, which are herewith given, divided so that the answers to each question follow consecutively.

Dr. Ellison Hillyer, of the New York College of Dentistry, says that in order to make an exact duplicate of a full denture, the presence of the patient is a factor not necessary to be considered.

As you do not state the nature of the material, whether vulcanite, gold, celluloid, or cast metal, I presume you mean vulcanite.

1. Cleanse thoroughly.
2. Cast the model upon the palatal portion of the plate, not necessarily extending posterior to the condyles—(oiling the plate is unnecessary).
3. In order to duplicate the "fullness" of the lateral portions and the mold and size of the teeth, cast two sections of plaster extending (*a*) from condyle to median line, and (*b*) from median line to opposite condyle, and from the base of the model to the cutting-edge of the teeth. (When plaster comes in contact with plaster Oliver's separating fluid—or other—may be used.)
4. In order to duplicate the exact thickness of the denture, cast the lingual portion, extending from condyle to condyle and covering the lingual surface to the edge of the cast, labial sections (*a* and *b*) extending thus over the cutting-edges of the teeth.

With these four parts "set" and removed, the teeth may be selected to fit the labial molds—proper shade—and ground exactly to fit; then set up and waxed upon the model,—the labial molds being in position relative to the model,—the thickness of the wax determined by the lingual cast in its proper relative position. When vulcanized and finished, an exact duplicate should result.

Dr. Wilbur F. Litch, of the Pennsylvania College of Dental Surgery, says that to make an *exact* duplicate of a full denture, either with or without the patient, would be practically impossible. To produce an approximately exact duplicate in the absence of the patient, run plaster into the plate to make a new cast. If there should be so much undercut that the cast cannot be separated from the plate without breaking, run the cast in sections, then to be firmly joined together for working purposes.

Placing upon the cast thus obtained the denture to be reproduced, run outside of it and the cast a plaster matrix in two or more sections to serve as guides for fullness and contour, length and position of the teeth.

Make the "bite" of a fusible alloy melting at about the temperature of boiling water; this can be run upon the grinding and cutting-edges of the teeth without danger of fracturing them, and, mounted in a suitable articulating frame,—Bonwill's preferably,—can then be used for mounting the teeth as would the ordinary plaster bite, with the advantage that it cannot readily be broken, and will not rapidly wear away in the prolonged grinding which would be required to procure an exact reproduction of the grinding and incisive edges of the denture to be duplicated. Teeth made in the same molds as the originals would probably be necessary.

Dr. Robert H. Nones, of the Medico-Chirurgical College of Philadelphia, maintains that it is not possible to make an *exact* duplicate of a denture, from the fact that the contraction and expansion of materials used in cast, die, and plate all operate to make slight changes; however, assuming that it is a denture mounted upon vulcanite to be duplicated:

1. Wash and scrub the plate with dilute ammonia water to free it from grease and other foreign material.

2. Slightly, very slightly, oil all of the surfaces of plate and teeth with olive oil.

3. Pour a cast in the palatal portion of the plate one-half inch thick, or more, and have it project beyond the edges of the plate all around. Smooth this cast and varnish its outer walls, in which three or more conical depressions are made above the plate-rim edges.

Remove plate from cast and set it back. Form a plaster wall over one-quarter inch thick about the outer sides of dentures and outer wall of cast. Place cast and all in an articulator, and run a plaster mold over plate and occlusal surfaces of teeth. Lock the articulator jaws firmly. When the plaster is hard, separate jaws of articulator, pry off the outer plaster walls. Select a set of teeth exactly like the others, and set them in the outer plaster walls. Make a base-plate of wax, put walls and teeth in position, and press softened wax beneath teeth until they are firmly held. Add more wax, faintly oil the plaster mold of the occlusal edges, and press the articulator jaws in position. See that each tooth fits exactly into the two plaster guides. Next, finish waxing, invest, pack, vulcanize, and finish. The inevitable shrinking of the vulcanite will make the second plate slightly different from the first plate.

Dr. George H. Wilson, of the Western Reserve University, Cleveland, Ohio, says that after giving the plate and teeth a thin coat of oil, fill, making the plaster cast. With the plate upon the cast, attach to one jaw of the articulator; set the other jaw of the articulator about one-fourth inch from the teeth; mix plaster stiff enough to stand without flowing, spread upon the occlusal and incisive ends of the teeth, overlapping the buccal, labial, and lingual surfaces about one-sixteenth of an inch; place the articulator jaw in position and unite with plaster. When the plaster has hardened, open the articulator and remove the denture; place base-plate wax upon the cast, with a roll of wax upon the alveolar ridge;

set duplicate teeth in imprints of teeth upon opposite jaw of articulator; close articulator, forcing the cervical ends of the teeth into the wax roll; with hot spatula unite teeth and wax roll to base-plate. After cooling the wax, trim the plaster away from the buccal and labial surfaces of the teeth; open the articulator and build the wax plate to contour. Now remove the lingual portion of the plaster imprint of the bicuspids and molars; close the articulator, proving the articulation. Now the case will receive the ordinary manipulations.

If the case is a metal denture, it will be necessary to make two casts, one to be used as a model in producing the die.

Dr. R. R. Freeman, of Vanderbilt University, gets accurate casts from upper and lower plates. With plates on casts, occlude and adjust according to the Bonwill rule, on a Bonwill articulator. Remove plates, run additional casts sufficiently thick and slightly expanded at base for countersinks; place each on level plane, plates on casts. Invest teeth in plaster, two sections, extending from plane up over teeth, dividing at median line. Having soaped, your plaster will separate readily where desired.

Separate sections, remove plates, adjust base-plate of wax on cast, and replace sections. If you have duplicate teeth, they may be readily adjusted to position in tooth impressions left in sections; otherwise make best selections you can and wax up. Remove these wax plates with teeth arranged to the casts in articulator for more accurate occlusion.

Return to your duplicate casts, wax to a finish, trim casts, flask, etc.; after vulcanizing and finishing up plates, to be certain beyond question that your occlusion is same as original plates, take casts from duplicate plates; on these casts adjust wax plates, transfer to original casts in articulator, build up to right length, fasten wax plates together, and in these place the duplicate casts, and adjust by Bonwill rule in Bonwill articulator.

Remove the wax base-plates, substitute the duplicate plates, and do such grinding as may be necessary to perfect occlusion, and you will have an exact duplicate of your full denture.

It is of interest to note that while no two of these replies are exactly alike, they are all practically the same, the differences being mere details of manipulation. This is some slight evidence that our teachers to some extent occupy common ground.

It is not improbable that many of the members are wondering wherein the practicability of all this lies, and why your Correspondent has propounded a question which would so seldom come up as a problem in actual practice.

In explanation it may be related first that a practicing dentist in the South some months ago wrote to your Correspondent asking advice which would enable him to duplicate a plate for a patient who had removed into a distant state, and who was willing to return the plate for duplication, but could not herself return to the city wherein the dentist resided. Advice practically similar to that given in the above letters was sent; the method advised, however, differing in a somewhat essential detail if absolute reproduction is requisite. This will be more fully explained in a moment.

The more especial reason, however, for utilizing this query is that the application of a method of this character should have more widespread practice than it has. Those dentists who frequently make upper dentures on vulcanite must have the too common experience of being called upon to repair these dentures. A most trying class of repairs is where the plate is brought back split along the median line. What is the common practice? I think that fully eighty per cent. of dentists merely roughen the plate along the break and add fresh rubber. What is the result? The repaired plate is more liable to fracture than when first made. There is now less strength to the new rubber, which is thinner than the original plate at the point where breakage occurred, and, secondly, all the old rubber is weaker, because it has been vulcanized a second time.

My practice for a long time, when repairing extensive fractures, especially along the median line, has been to remove the old rubber entirely and replace it with new. This practically is reproducing a plate, except that the old teeth are utilized. The method is as follows:

The edges of the fracture are brought tightly together and firmly held by drilling holes on each side of the break and tying with linen thread. A model is then made of the palatal surface, the plaster being used thin enough to assure a sharp impression. The plate is not oiled or soaped, but should be wet so that the plaster will flow accurately. This model is trimmed so that it is no larger than the circumference of the plate itself. It is set upon a piece of glass, and, being thoroughly soaped, plaster is built up against the model and external surfaces of the teeth, up to and even with the masticating edges. When set this rim is trimmed smooth, and a third layer of plaster is poured over the lingual surface of the plate, extending over the exposed cutting-edges of the teeth and slightly lapping upon the rim of plaster which was poured secondarily. When this in turn has set, it is pried off carefully; next the outer rim is cut along the median line with a knife, until it can be separated in two pieces. Lastly the threads which hold the plate together are cut, and the plate itself carefully removed from the model. The teeth are now to be taken from the old rubber, thoroughly cleansed, and returned to their places in the rims, which are to be set in position against the model. Enough wax is run in to hold the teeth and models together, but no attempt is made to "wax up" the piece in the ordinary meaning of the term. These models with the teeth in place are then flasked in the lower half of the flask. When the surrounding plaster shall have set, the third part of the mold is placed in position and the upper ring of the flask put on, when plaster is poured around it. Thus when the flask is opened we have a mold for our new plate which was really an impression of the old, and consequently the new plate will be reasonably like the others.

It may be well to mention here that when it is known that the patient is apt to again break the plate along the median line, a precaution against this should be taken. To accomplish this a duplicate outer rim should be made before taking the teeth off of the rubber, and this rim should be removed in three pieces, so that one piece holding the four incisors (or the two central blocks where gum blocks are used) should be in one piece. A stout platinum wire should be bent so as to touch the pins of all the teeth, and when waxed against them the teeth should be invested and the platinum bar soldered direct to the pins of the teeth. Thus the incisors will be united, but will still assume proper position in the mold, and this bar will supply sufficient strength to prevent recurrence of fracture, whereas any bar of metal placed in the rubber and not attached to the teeth weakens rather than strengthens the plate.

In relation to the best clasp for retaining partial dentures made on metal base, the method of making the same and attaching to plate, Dr. Hillyer states, "This question involves such a lengthy answer, the selection of the clasp being determined by the shape and condition of the tooth to be clasped, I refer you to Charles Hunter's 'Mechanical Dentistry,' pages 60-70, inclusive, which will partly answer the question."

Dr. Litch states that the best clasp for the average partial denture is made of an alloy of gold and platinum, possessing the maximum of strength and elasticity.

The thickness of the clasp is determined by the width of the interdental space, and the extent of strain to which it is to be subjected by the weight of the plaster or the force of mastication.

The clasp as a rule should follow the contour of the gum-line and of the teeth to be clasped. Upon the gum it should rest lightly; the teeth it should fit closely and grasp slightly at the point between the gum-line and the greatest convexity of the buccal and palatine surface.

The clasp, as a rule, should be no wider at any point than is necessary to secure this adaptation; any width of metal beyond this is usually useless mechanically, and unnecessarily makes subject to mechanical or chemical abrasion on increased surface of tooth-substance.

A clasp is most conveniently made by first shaping an exact pattern in copper or tin to serve as a guide in cutting the clasp metal. The clasp is bent into the desired form by pliers of various shapes, special clasp benders, and by the use of the hammer and anvil; concaving longitudinally a thick clasp is best done by a small corundum wheel.

The plate is cut away to a sufficient extent to allow the clasp to rest between it and the tooth for which it is made; in simple cases, if the cast is perfectly accurate, plate and clasp may then be cemented together, invested, and soldered. Ordinarily, however, a better result will be obtained by perfecting the final adjustment between clasp, tooth, and plate in the mouth rather than upon the cast.

If it is found impossible to remove the plate and clasp from the mouth without breaking the cement, a small plaster impression can be run over them, serving as a matrix, into which, when removed from the mouth, clasp and plate can be placed in their exact relative positions, and into which matrix, after oiling, the investing material can be poured.

Enough solder should be used to attach the clasp strongly to the plate. The ends of the clasp should be left free, in order that by bending their pressure upon the tooth may be increased or diminished at will.

Dr. Nones says that the best clasp for metal plates is made of platinum gold alloy. The gauge of metal depending upon the width of the clasp, the broader the clasp the thinner is to be the metal, the range of thickness being No. 22 to No. 27. It is to be determined by the position and shape and condition of teeth which are to be clasped.

The positions of the artificial teeth, the direction of stress, etc., must all be taken into consideration in determining the size, shapes, and positions of clasps. A clasp should not impinge upon cementum or exposed dentin. It should have two free and elastic ends, at preferably the buccal aspect of the clasped tooth. My own opinion is that a clasp should fit a tooth accurately, not merely touch at four points. It should be determined whether spurs resting upon the occlusal surfaces of teeth are desirable; usually they are on partial lower dentures.

A pattern of the clasp is made in stout tin foils. A piece of metal, its fibers running the length of the cast, is cut and filed to this shape, its edges being beveled and smoothed. This piece is annealed, and by means of pliers (contour, flat, and round) the clasp is adjusted to the surfaces of the teeth. It is best to begin bending at one end of the clasp.

The clasp must be tried gently on the cast, so that the plaster is not scraped in the slightest degree. When fitted, the loose ends are bent out, so that the clasp slips on and off the tooth easily. The plate is placed in position, and the clasp also; whenever the clasp impinges upon the plate, the latter is filed away until clasp sets in its correct position and joins the plate accurately for more than one-half its length. Boil in acid, cement together, invest lightly, and solder with a minimum of solder. If the teeth occupy irregular positions, some portions of the clasp must be made to fit inaccurately, or else the clasps be supported by elastic standards after the Bonwill method.

In regard to the best clasp and how to make it, Dr. Wilson says, "Clasp one-eighth to three-sixteenths of an inch wide, made to span two sides and three angles of the tooth. Clasp concavo-convex from edge to edge; remove the occlusal edge from opposite the attachment to the buccal end, giving a gradual taper. Attachment as near the center as practicable, and from one-eighth to one-quarter inch in extent.

"Material, gold alloyed with platinum; gauge 26 to 28 B. & S."

Dr. Freeman says he would prefer to crown with gold all teeth to be clasped; otherwise might use skeleton clasps closely adapted to bulbous portion or body of tooth, and attach by arms to plate, leaving neck of tooth free to cleanse.

Close adaptation of clasp to tooth is best secured by burnishing to tooth thin, pure gold; over this adapt 22-carat, solder together, and shape clasp as desired; adjust in mouth to plate with hard wax; remove, invest, and attach with solder.

This subject of clasps is one of immense importance, because when it shall have been finally solved dentists will learn to save any teeth which can be made to carry a clasp rather than to extract and resort to that abomination, a suction plate.

The first point of dispute between practical men will be as to whether the clasp should fit the tooth accurately or merely touch at two or three points. My own voice would be raised in favor of an accurate fit wherever it may be obtainable, and it may be had with increasing frequency as skill is acquired by persistent effort. But I wish to make the dogmatic assertion that absolute accuracy will seldom if ever be attainable where models alone are depended upon. In simple cases a clasp may be so well fitted to a perfect model that it will fit the tooth equally well; but even in these cases, if the clasp and plate are united upon this model, without further recourse to the mouth, absolute fit will never result. Dr. Litch says, "The plate and clasp may be cemented together, invested, and soldered." Then he adds, "Ordinarily a better result will be obtained by perfecting the final adjustment between clasp, tooth, and plate in the mouth rather than upon the cast. If it is found impossible to remove plate and clasp from the mouth without breaking the cement, a small plaster impression can be run over them, serving as a matrix, into which, when removed from the mouth, clasp and plate can be placed in their exact relative positions, and into which the investing material may be run."

An analysis of the above shows that in some instances even Dr. Litch unites clasp and plate, depending solely upon the plaster cast. Secondly, that he cements the two together sometimes and perfects the adjustment in the mouth, and that it is only when he cannot remove the plate without breaking the cement that he has recourse to the method of taking an impression of the clasp and plate in position.

I contend that instead of being an occasional reliance it should be an invariable rule never to unite a clasp to a plate without placing the two in proper position in the mouth and then taking an impression. In the first place, the yielding soft tissues allow the plate itself to be held with one finger, so that it sets snugly against the roof of the mouth, a position which it could never occupy by any other method. Then the clasp itself, however well made, can only be placed in its best position by trying it upon the tooth itself, and being in that position the impression should be taken. Moreover, in some cases, especially in making clasp plates in treatment of irregularities where the molars in young mouths are short, it often becomes necessary that the clasp should pass below the gum in order to get a firm grip. Any effort of this kind upon a model will be purely guesswork, and such a clasp to be a perfect success must be finally fitted in the mouth.

Where clasps are to be used which, because of the peculiar shape or irregular position of the tooth, cannot be allowed to follow the gum-line, but must hug the tooth near the occlusal surface and be united to the plate by an upright connecting band, the same method should be followed, and the connecting band made and attached when the plate and clasp is finally upon the model made of the investing material.

Accuracy of clasps, where they are to be used in connection with vulcanite, demands that the first model of the mouth should be used merely for making the clasps, which are then to be finally fitted to the natural teeth, and while in position an impression is to be taken. The resulting model shows the clasps properly adapted to the teeth, and in their true position. They may now be very carefully removed and attachments soldered so that they may be held in the rubber. A vulcanite clasp plate made in this manner goes to place accurately and fits snugly, a result obtainable by no other method.

It must not be understood that in leaving this subject I think that the final word has been said. A book might be written upon the various styles of clasps and methods of making them.

## *Discussion.*

Dr. R. H. HOFHEINZ. The report of Dr. Ottolengui so covers the ground relative to the two questions that I can add practically nothing. I agree with Dr. Litch that no *exact* duplicate can be made with or without the patient. My method of making such duplicate would very much correspond with his. I lay particular stress of the "bite" being made of fusible metal, because the plaster teeth are very apt to be slightly worn by the frequent closure of the articulator, thus endangering a precise articulation.

Regarding clasps, it is my opinion that they are all dangerous to a degree as to the welfare of the tooth which they encircle. Clasps should be made as accurate as possible and as narrow as possible. No matter how well fitted, a slight friction must prevail, owing to the unstability of any partial plate excepting when such plate is fastened by partial caps upon bicuspids or molars. Time will destroy any clasp tooth, and it is for this reason probably that Dr. Freeman has advocated the crowning of all teeth to be clasped.

What else could I say regarding prosthetic dentistry that has not already been said and repeated again and again?

An interesting question arises for the dental observer. How and to what degree has the progress of prosthetic dentistry influenced operative dentistry? Has it influenced operative dentistry for good or ill? Has operative skill been stimulated to higher aims by the development of prosthetic dentistry?

My dictum, based upon much careful observation and a jealous tendency as to the rank and standard of operative dentistry, says emphatically "No."

It is but a few years ago that to the use of vulcanite has been assigned the cause of much decline in prosthetic dentistry. The old-time gold plate, the making of which required a high degree, at least, of technical skill, was relegated to the past and the rubber plate took its place.

Gentlemen, the mischief done by the rubber introduction is no comparison, in my mind, to the mischief done by crown- and bridge-work.

I make the bold assertion that the indiscriminate use of crown- and bridge-work is to blame for a decline in operative skill. The readiness with which dentists condemn teeth nowadays as unfit to fill but safe for crowns is appalling. Had our predecessors done the same, we would be much nearer to the edentulous race than we are. The ease with which crown-work can be done, if compared to highly skillful operative dentistry, is undoubtedly the main cause of the wholesale butchery, of the wholesale unesthetic dentistry that confronts us in the profession to-day. How much easier is it to cover a first bicuspid with an unsightly gold crown—or even a porcelain one—than to introduce a properly constructed contour filling, well condensed, well knuckled, highly finished? Is it altogether the physical labor that speaks against the laborious task of the tedious filling process, or has the self-advertising gold crown something to do with it? With many it certainly has.

It would be a great lack of judgment did I come here to condemn crown- and bridge-work. Every dentist of a large practice finds more or less judicious opportunity for their application. I look upon the correct use of crown- and bridge-work as a blessing to the dentist and patient. Aside from its ordinary function there is one where it has served admirably in my own hands.

There are but very few cases of orthodontia where extraction and replacement by a bridge is justifiable. I brought with me a case, however, where such operation seemed the only correct method to obtain the proper cosmetic result.

Case 1 shows very defective enamel,—lack of lateral, abnormal size of centrals. Had I regulated, the median line would have been way off. That, together with the defects in the enamel-structure, induced me to extract and replace the three centrals by four bridged teeth.

The other two cases are cases of irregularity known as protrusion of the lower teeth. The models will show how excellently bridge-work has served not only physically, but esthetically.

It is the wrong, the injudicious, the reckless application of crown- and bridge-work which I take opportunity at this instance to condemn, because the paper of our worthy secretary permits of but little direct discussion.

Dr. Kirk, in an address before the Eighth District Society, in Buffalo, urged the point of a specific preliminary education being required for the dentist. I heartily agree with him. One feature of particular importance in all preliminary education should be that of esthetic training.

The man who possesses culture, and with it the reverence and love for nature, will long hesitate before he sacrifices a natural organ and substitutes it by an artificial one. It is this lack of reverence for nature's grand work, and it is this lack of culture and esthetic training, that compels us to see the manifold monuments of showy, gaudy, unhandsome dentistry,—an inclination which, if continued, will greatly endanger operative dentistry in its loftiest and most skillful branches.

Dr. F. A. GREENE. I do not know that I ever had occasion to duplicate a plate, but in repairing a break of a plate, as Dr. Ottolengui has stated, I replace the old rubber with new, and I find that one very good feature is not to use pure plaster, but to use something with it,—marble-dust, pumice-stone, or sand. If you make a model of pure plaster, there will always be a change in the shape when the plaster sets; but if the same model is made of plaster and about one-third marble-dust, you cannot detect any change. You can test that in a series of cases in new work. Take your model, and with a pair of compasses make little points at the condyles and then make a corresponding mark with the compasses on a piece of paper; after vulcanizing, where you use pure plaster you will find a difference; but if you will do the same thing where you use marble-dust with the plaster you will find that the compasses go into the same points. I have known as much as one-eighth of an inch difference to take place with pure plaster. In making all models, add something to the plaster to control the contraction. As to the question of clasps for teeth, I think we could talk upon it for any length of time and yet come to no conclusion, for the reason that circumstances are so different. The ideal attachment, in my opinion, is the Condit system of removable bridge-work. At the side of the tooth is a tube that is open at one side. On the plate is a pin that fits into the tube, with another tube that goes down on the outside. I do not think there were ever clasps put around a natural tooth that did not eventually destroy that tooth.

Dr. VAN WOERT. I want to add a little to what Professor Hofheinz has said, but before doing so I want to give evidence or testimony as to the practicability and advantage in taking an impression of the mouth with the clasps in position. I did not quite understand that when Dr. Ottolengui was reading it, and he asked me a moment ago how many I thought followed that practice. I said I knew of one person, and that person was myself. I had never done it until he showed it to me some years ago.

I want to talk of the slaughter of good teeth for the sake of introducing crowns and bridge-work. A large percentage of it is done for the sake of advertising. I was asked to-day by a gentleman what I would do with the corner of a central or lateral broken off,—whether I would cut it off and crown it, or fill it with gold. He said, "There is a gentleman near me who cuts them off and crowns them, because the fillings do not hold." "Well," I said, "he does not know how to do it." I very seldom have applications to put gold crowns in the front of the mouth, and when I do I invariably refuse. Some years ago I put in gold crowns in the front of the mouth, where the man's teeth were like tree stumps, and that was the only thing I could do at that time; although if he presented himself to me to-day I would reconsider it. On the other hand, cases are constantly being presented where the patients make application for bridges. How many of those cases do you find are practical? Is it a beautiful thing? Yes, when it is first made. Does it not satisfy the operator and the patient at the time? Yes; but how long does it last? I can refer you to lots of Brooklyn gentlemen who knew at the time the amount of bridge-work I was doing; but it has all gone up in the air. I believe to-day the introduction of crowns and bridges is the greatest curse to the profession that we have had in twenty-five years. I think the time has come when the better and more reasonable thinking members are going to shut down on it. It has cut off the manipulative ability of some of our old operators in gold work, and has driven them to amalgam. You go to them and they say they are too old to go to the trouble of putting the gold in,—that they can buy the crowns and put them on. But is that the best restoration we can make? Not by any means. We will all of us have to go back, and I have gone back, thank God. I use my gold foil more and more every day, and the time will come when most of the reputable practitioners will abandon crowns and bridges. Would a surgeon cut off a man's leg or foot and put a wooden one on because a man had a crooked leg, or had corns or bunions? Not by any means. He would do all he could to save it. We should do all we can, by skillful manipulation and gold foil, to restore those teeth to proper condition.

Dr. HOFHEINZ. As Dr. Greene correctly remarked, I do not believe there is any clasp that will not in time ruin a tooth that is unprotected. My method is to use partial crowning instead of partial clasping. I make a permanent partial crown from the second bicuspid or molar, and upon that I make the removable crown (which is not my own device), and over that a vulcanite plate. That not only prevents chemical abrasion or mechanical abrasion, but it prevents the plate from infringing on the soft tissues, preserving at all times correct articulation with the upper denture. I wish to say that within the last four weeks I removed two crowns for which there was absolutely no necessity. In one tooth there were two large compound cavities, and in the other one large cavity, the mouth being in a very normal condition. I am going to leave that crown off and restore the tooth. This is only one of the few instances that could be mentioned.

Dr. A. M. WRIGHT. I was surprised to hear the assertion that the doctor had not used a gold crown for incisor teeth, for I did not suppose any reputable man had ever done it. Dr. Greene spoke of using marble-dust in taking an impression. Twenty years ago, at the meeting of this society, a gentleman advocated the use of marble-dust in this manner: After varnishing his cast, he flowed pure plaster into the cast and then very quickly dipped a little marble-dust over it. It gives a smoother appearance than by putting the marble-dust into the plaster.

In regard to bands to hold partial plates, or anything of that kind, it depends to a great extent on the person who is wearing that partial plate as to the utility of the band, or the future decay of the tooth underneath the band. I have seen in mouths both wide and narrow bands, and decay underneath the bands. I have in my own mouth one tooth banded that has been there for eighteen years. The band is not larger than an ordinary pin. The tooth has not decayed yet, and when it does I will put it on another tooth. My instructions to the patient are that the band must be cleaned thoroughly inside and outside, and the teeth which they surround must be thoroughly cleansed two or three times a day. If that is done, you will not hear anything more of the decay underneath the band.

Dr. Goldsmith. One point about clasps has not been touched upon: that is in regard to what Dr. Bonwill has said about them. I think myself that clasps, if they fit and touch in four points and encircle the tooth exactly at its widest part, going just a little above and a little below, will be the best-fitting ones. The clasp should be soldered only at one point,—where it will give the greatest strength.

In regard to the wear of clasps on teeth, it is very much the fault of the patient. They allow a little scum to accumulate on the inside of the clasp, which is very acid, and will eat into the tooth. If the patient will use a bit of orangewood and pumice-stone, that can be taken away. The clasps Dr. Bonwill has described will take the place of bridge-work. Bridge-work has its place, but the place is a very small one.

Dr. M. S. Smith. A little practice that has been successful in my hands is in tipping teeth. I do hate to destroy live pulps, and where I find both corners are gone and the tooth very frail, I grind the surface, beveling from the neck of the tooth down to the cutting-edge of the tooth on both sides. I grind off a little to the cutting-edge, then use thin gold foil and burnish that to the tooth on three surfaces, stiffen it with solder of 22-carat plate, solder it, and again grind and cement that in place. It looks very well, can hardly be detected from gold filling, and you have an edge that will protect the frail edges of enamel. It is only necessary to break away very little of the frail edge. You can burnish the gold over the frail edges with any amount of assurance, and as long as it stays there it will protect the edges of the enamel.

Dr. E. A. Bogue. It is with much pleasure that I meet my brethren here after some years of absence. It is possible that some of the gentlemen present have not seen or examined the specimens exhibited by Dr. Elliott, who has not long since gone to the other world. Both ends of the clasps were soldered to the plate, but the wire bent in such a way as to inclose the teeth. I have used that system of clasping mainly for the last five or six years, since Dr. Michaels, of Paris, showed it to me. When I have been able to use that system I have been astonished not only at the freedom from decay, but by the extraordinary hold which I get in this way (illustrating). See that both ends of your wire are soldered to the plate, and do not let the two ends that are in the air be soldered together. Dr. Greene, I believe, is out of date, although he has been generous enough to give his best method for the accomplishment of his work. The question has arisen as to whether members of a liberal profession should be liberal in their dealings, or close; and I was very much pleased to hear what he had to say. As a gentleman said to me not many days ago, "Were it not for the fact that my professional brethren joined societies where they tell everything they do, I should not be a dentist, but should be shut up in a laboratory; and I am very thankful to them for their good work."

Dr. Ottolengui. I want to say a word about clasps in relation to tooth protection or injury. I cannot prove my assertion, but I believe that the percentage of injury done by a properly fitting clasp is not one-tenth of one per cent. I do not believe it is entirely the patient's fault when you find decay under your clasp. That is a nice, easy way out of it. I have seen well-fitting clasps in the filthiest kinds of mouths last for twenty years without injury to the teeth, and it is the idea in Europe that the band around the tooth inhibits decay rather than otherwise. I think the danger is more from the spaces left between clasps and the teeth. This idea of the fit of a clasp will come home to you only after you begin to take impressions of your clasp on the tooth, and when you remove that impression and then remove that clasp from the tooth, if you find plaster between the clasps and the tooth, it does not fit. It is possible to make clasps fit so well that spaces will not be left between, and with that kind of clasp you will not have decay. In the application of clasps to plates which are to carry obturators for cleft palate, I believe the importance of keeping the integrity of those teeth is greater than any other case. Patients depend upon those teeth not only for mastication, but also for articulation and speech. I have seen clasps made by Kingsley twenty-five years ago still in the mouth, and the teeth without decay, and that is an evidence that a man of skill can make these clasps. Hesitate next time before you tell your patients that it was not your fault.

(To be continued.)

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## SEVENTH DISTRICT DENTAL SOCIETY OF NEW YORK.

(Continued from page 579.)

Dr. A. Osgood, of Bath, read the following paper:

### Plastic Fillings.

All I shall attempt in this paper is to give you some personal experiences in the working of plastics in the filling of teeth.

For the past thirty-five years I have kept a record of every filling I have placed in a tooth. It tells me the name of each material used, and also the different makes of alloy, cement, or gutta-percha. If it is a combination or mixture of any two of these, it is also recorded. If the tooth is in any abnormal condition that is perceptible, a note is made of it. If a pulp is destroyed, or protected when alive, the fact is stated. All this gives me the advantage of being able to form some judgment of the relative merits of the different materials we use in filling the teeth. It has cost me a good deal of time to keep so complete an account of my work, but it has afforded me a great deal of satisfaction.

I have used in these years thirty kinds of alloy, twenty-four different makes of cement, and ten of gutta-percha.

As amalgam has been the material most extensively used, we will consider that first. The price which is placed upon the alloys may be worthy of mention. I have paid from one to seven dollars an ounce, generally from two dollars and a half to three dollars and a half, and I have not found any better results from using an alloy that cost over three dollars and a half, and I could speak in praise of one that only cost one dollar when I first used it, but the price has gone up and the quality down. The seven-dollar alloy, it was claimed, contained a large percentage of gold, but it had the weaknesses of the others of its kind.

I have found that the same amalgam that will give great satisfaction in the teeth of many persons will be, in another class of teeth, when the same care is observed in the preparation of cavities, a large-sized disappointment. There are teeth in which any amalgam is incompatible, where there is a shrinking away from the walls, dark lines, leakage, decay, and your work is a humiliating failure. To judge of the quality of any amalgam, you must use it for many different individuals and in various grades of teeth.

In the large majority of cases teeth that are filled with any material within a few years after their eruption will require to be refilled when they have become more dense in their structure.

I have no original or special method to offer as to the preparation of amalgam before inserting it in a cavity. I mix in a glass mortar, adding the mercury in small quantity, and am careful not to get a surplus. A portion of the mass is pressed between thumb and finger with a rolling motion, until the mercury is expressed as much as possible, and the remainder is squeezed in chamois skin by pliers, for the finishing part of the filling. Matrices are used for approximal cavities, and very frequently the rubber-dam.

I suppose the mention of copper amalgam will be an offense to many ears, but I must take the chance.

It is hard to realize how the craze walked through the profession a few years ago. Many of the high lights used it in their practice, and advocated it to everybody. I am under the impression that Rochester quite escaped the epidemic.

At the union meeting at Syracuse in 1888, Dr. Barrett gave a talk on copper amalgam, told how to prepare it, etc., and Dr. Southwick said he made exclusive use of it for all cases requiring amalgam, and no one uttered a word of warning or condemnation. It was after this that I made use of the stuff to a moderate extent, but sufficiently to become satisfied that there was in it a great saving quality, if we only could find out how to avail ourselves of its hidden property to accomplish what we desire, so I experimented, as so many others have done. For the past five years I have been in the habit of mixing in a little with other amalgams, say from five to fifty per cent. I keep a box with a lot of small pieces, and when I have a cavity to fill in a low-grade tooth, I heat such sized piece or pieces as I want in an iron spoon until the mercury shows on the surface, and grind it in with the amalgam intended for the filling. I saw a few days ago some fillings put in in 1892. They were in large approximal cavities in the molar teeth, and were made by a mixture of Flagg's contour alloy and Weagant's copper amalgam, about equal parts. I made a careful examination, using a large magnifying mouth-mirror. There was no decay, no shrinkage, no expansion, and the fillings seemed perfect in every way, except the color was not beautiful. This was in a mouth in which amalgam fillings usually fail in a very few years. The teeth appear to have a good structure, but are not disposed to be easily saved. This method will not always be satisfactory, but I am satisfied that in a large number of cases a little copper is a good thing. For the improvement of the color of any amalgam, gold can be dissolved in the mercury, from one to four sheets of No. 4 foil to one ounce of mercury. I have tried it with two sheets to the ounce, and think very well of it. Any higher number would be too rich for country practice. I got the idea from the late Dr. J. E. Register, a brother of Dr. H. C. Register, of Philadelphia.

We find but little use for amalgam in front of the bicuspids. I have occasionally filled large cavities in the incisors with amalgam, and while still soft carefully removed it from the entire length of the labial wall and formed a new cavity with retaining shape. Then I fill that with temporary stopping, and at a future sitting fill in front of the amalgam with gold, making a good-looking and saving operation.

When I sat down to write this paper and began to realize how very little I knew about amalgam, I almost came to the point of sneaking out of my promise to furnish something on the subject, but it may serve to bring out in its discussion some ideas or facts that will be of benefit.

Oxyphosphate of zinc as a filling preparation for the teeth has been in use since about 1870, as nearly as I can trace it. Previous to that we had the oxychlorid of zinc, or os artificiel. This was very unsatisfactory as a cavity filling-material; would last but a short time, and was of too light a shade to look well when in sight. It is still used by some operators in root-canals. There has been but little, if any, improvement in the lasting quality of oxyphosphate since its first introduction. The colors are much better, so that we can match the various shades of the teeth very well.

As I said before, I have used twenty-four different makes of cements, and am yet hoping for something better. As a laster I give Poulson's Granite the preference, believing it to be as durable as any on the market. Have not tried the Lynton cement, which has recently been introduced in this country.

Oxyphosphate is exceedingly useful in many ways, but it has one property which should be kept in mind; that is, of destroying the life of the pulp when placed in a deep cavity. Very much harm has been done in this way, and there should always be some material interposed between the filling and the bottom of this class of cavities. It has been my habit for a number of years to apply Canada balsam and then a disk, or disks, as the case may be, made from linen paper. These are cut out with a revolving punch, which you can get at any hardware store, that makes four sizes, and the smallest is the most useful.

Dr. Downs, of Owego, lines the entire cavity with gold foil, which, I should say, is good practice. When I fill an incisor or cuspid that has a thin labial wall with cement or gutta-percha, I always line that wall with four thicknesses of No. 4 gold foil, and it gives the tooth a very nice appearance.

Dr. L. S. Straw, of Newburg, mixes finely powdered copper amalgam with oxyphosphate, equal parts, and claims to get excellent results. It makes a very dark filling, but it is more lasting than the cement alone. I have tried it. I frequently mix in a little alloy filings, not using any mercury, and I believe it lengthens the days of the fillings. Bement's one dollar and a half alloy is good for the purpose, as it does not darken the mass so much as most alloys.

In the DENTAL COSMOS for November, 1897, there is an article by Dr. Stowell, of Pittsfield, Mass., on hydronaphthol. One of the uses he makes of it is to combine one part in bulk of hydronaphthol to three of the zinc oxid, mixing this combination with the phosphoric acid and using as a cement for pulp-capping and for protecting permanently all exposed sensitive or soft parts in live teeth, as an antiseptic non-irritating lining for all classes of fillings. I have been doing this since the issue of the journal named, and so far with great satisfaction.

A good many times I have had patients with cavities in the front teeth that were large and in a shape that a gold filling would be uncertain, or beyond my skill. I have overcome the difficulty by filling the cavity flush with cement, and leaving it to become thoroughly hardened. Then at a subsequent period I remove a portion of the cement in front, and fill with gold. I have cases running back to twelve years in which the gold still remains; the cement has been renewed occasionally as it wasted away, but there is no loss of tooth-material. It should always be realized that the introduction of a good oxyphosphate filling is not a really easy matter. It requires a good deal of careful manipulation to thoroughly fill a cavity, for there is a tendency for the stuff to crawl out, especially at the cervical wall, in a way that will leave a small opening there that will be fatal to success. A narrow matrix should be placed at that point. That a dry cavity is absolutely essential to a properly made oxyphosphate filling is another thing that should not be forgotten. Steel spatulas are not good for mixing; these instruments should be made of some white metal. The R. G. Stanbrough Company make the best I have seen; cost, thirty-five cents. One should have two or three of them. You can clean your instruments easily after working the cement by having a bottle with a large mouth, filled up about an inch with ammonia, and standing the tools in it for a short time. The bottle should be fastened in some way, so as not to tip over and cause bad language.

We will now turn to the third and last branch of the subject.

I am a strong believer in gutta-percha as a tooth-preserver. With it we can carry along the teeth of the young until they have arrived at an age when gold, or some other metal, is the proper filling. The red base-plate, for some cases, is the best we have.

Dr. La Saale's method of mixing, by the aid of heat, red gutta-percha and soapstone makes a good filling. My favorite prepared article is Professor Flagg's "high heat," and the Premium Stopping sold by the White Company I make some use of. All of these preparations in most mouths become soft on the surface, bulge out, and present a bad appearance, but you will rarely find decay under them. Not long ago I removed from large cavities on the buccal surface of the lower right and left molars gutta-percha fillings that were placed there sixteen years before, and although they were very soft on the surface and bore a wretched appearance, no decay of the teeth was found. The teeth of the mouth were below the average quality. It is very largely useful as a filling for the deciduous teeth, and the red base-plate is usually preferred for this purpose. When you find two adjoining cavities in the temporary molars, I deem it good practice to fill them as one cavity and let the pressure of mastication spread them apart, thereby making more room for the succeeding set. Dr. Bonwill recommends this very strongly. When decay has extended high up under the gum of an incisor or cuspid on the labial surface, and the cavity is to be filled with gold, I have placed Flagg's high heat stopping under the gum, and after carefully trimming it, proceed to fill the bulk of the cavity with the gold. Fortunately such a requirement is unusual.

To make gutta-percha fillings stick, the essentials are a dry cavity and Canada balsam. I will tax your patience to say a few words about this very valuable preparation, which no dentist can afford to be without. I never use gutta-percha without first applying the balsam to the cavity-walls, and it is a constant aid in starting gold fillings. I never have use for retaining pits. The balsam should always be hardened by being placed in a porcelain dish (a discarded butter-dish is good), and by a low heat being placed under it for several hours, or long enough so that when it is cool it is a hard, friable substance. Place a few small pieces in a small bottle and add chloroform until it is a thin fluid, and it is ready for use. The bottle should be in convenient reach from the chair, and should be fastened to something that would prevent its tipping over. It is a great disaster to have it spill on your bracket and instruments.

### *Discussion.*

Dr. FRANK FRENCH, Rochester, said Dr. Osgood has given the profession much valuable information during a long and successful practice, and we are grateful to him for the light he has let into dark places for our benefit, and the rough places he has smoothed over for our footsteps. When we attempt to realize what it means to keep a complete record of each tooth filled and all data of the operations, when and how filled, and the materials employed, and when possible the after-history of the tooth, we will see that such records are of incalculable value as a guide in practice. Think of such records covering the use of thirty different amalgams, twenty-four kinds of cement, ten forms of gutta-percha. This is what Dr. Osgood offers us to-day. He proves that the same amalgam works differently in different mouths; this is probably on account of the variations in the oral secretions, owing to individual difference in health and condition.

As to the shrinkage of amalgam, Dr. French doubted whether the change of form in a filling was the result of shrinkage, or whether it was not due to different methods of crystallization of the mass, owing to the composition and the amount of mercury. The laws of crystallization were very imperfectly understood, but he was inclined to think that the stability of the filling depended upon the mode of crystallization, which depended upon laws which were not as yet known. In mixing the amalgam, Dr. Osgood says he is always careful to use as little mercury as possible, but says that he takes it out of the mortar when mixed and rolls it between his thumb and finger, etc. This it seems would leave more mercury in the filling than after removing it from the mortar to rub it in the hand and then squeeze the mercury out through a piece of a kid glove.

In inserting amalgam fillings in approximal cavities he always uses a matrix. Could not see the advantage of making a filling half with amalgam and half with gold. To do this properly would take as much time as to use gold only, and should cost the patient about the same price.

Dr. Osgood said he could not get as much for a half-amalgam filling as he charged for an all-gold one, and, practicing as he did in a country town, had to do this class of work to get the price down within reach of the people.

Dr. French said that he used oxychlorid of zinc with a slight admixture of iodoform in filling root-canals. When Dr. Osgood said oxyphosphate would endanger the life of the pulp, he thought he must have meant oxychlorid. The latter will in many cases cause the death of the pulp in a large filling, but not so with oxyphosphate. He thought it required more skill to use oxyphosphate than amalgam; the rubber-dam should be applied in all operations of filling with either material. He believed in gutta-percha, but saw too much of it. When used as a temporary filling it was liable to last too long; he had a lady come to him last week with a tooth that had a temporary stopping in it that he had put in nine years ago to last a week. He considered this a fraud and a robbery on the profession. The old-fashioned Hill's stopping was about the best gutta-percha in the market.

Dr. L. Requa, Rochester, said that it was bad practice to put gutta-percha under a gold filling to protect the pulp, as the gutta-percha would expand and cause trouble. In putting in an oxyphosphate filling he always added pressure on it while it was hardening. He filled the cavity overfull and applied pressure with his finger; this caused it to be more dense and added to its durability. This practice is based upon a series of experiments he made at one time, which proved that a mass of oxyphosphate hardening under pressure would resist one-third more weight before it would be crushed.

Dr. I. C. EDDINGTON said that some teeth were so constituted that they would stand almost anything in the way of abuse, but others were so frail that the most careful treatment only would save them. He thought perhaps there was more in the effect of electrolysis in the mouth, because of the different metals present as fillings and plates, than most were willing to believe, and this should influence the decision as to the filling to be used. Gutta-percha put in a cavity over soft dentin and removed after some time has elapsed will be found not to have affected the density of the soft dentin at all, while an oxyphosphate filling in like circumstances would cause the dentin under it to become hard. A metal filling against soft dentin will not succeed.

Combination fillings in poor teeth had in his practice been successful, and he believes it is because of the electrical action between the metals. Dr. Palmer had demonstrated the electrical action when different metals were in the mouth.

He spoke of a case which had been reported at a former meeting, of a lady whose teeth were full of cavities and so soft that it seemed almost as if they should be removed. They were filled with cement as an experiment, and recently on examination were found to be apparently good and hard in texture, and he believed they would stand gold fillings.

He did not like to use cement in cavities where the cervical margin was near the gum, because the cement will wash away at the margin. It is good practice to fill such cavities at the margins with gutta-percha.

Dr. F. M. ROOD thought it was rare that the cervical wall was properly filled, as it requires very careful manipulation.

Dr. OSGOOD said it was difficult to make a good filling at the cervical margin except with the use of the matrix. It is excellent practice to put a bit of gutta-percha at this point. He had seen it stated that thin celluloid would make excellent matrices for cement fillings, and intended to try it. He would repeat what he said about oxyphosphate killing the pulp; it will do it, and especially when the same cavity is repeatedly filled, as so often has to be done.

Dr. ROOD thought it was good practice to line a cavity with a very thin oxyphosphate, and then fill with a thicker mixture.

Dr. B. S. HERT said that his cement fillings always washed away at the masticating surface before they did at the cervical walls, and he did not recollect a case of a pulp being killed by oxyphosphate in his practice.

Dr. W. W. SMITH agreed with Dr. Osgood as to the danger of oxyphosphate, and thought it was the acid rather than the pressure that killed the pulp. The death of the pulp is so gradual and so quiet that it may not be known for years, when any derangement of the health may cause trouble to begin. A good way was to protect the pulp by lining the cavity with Canada balsam and tin foil. By pressing the tin foil upon the balsam with a piece of cotton a good adaptation will be obtained. A matrix is almost indispensable with oxyphosphate fillings.

Dr. F. H. LEE agreed that repeated use of cement will almost certainly kill the pulp, unless varnishing the cavity will overcome the danger.

Dr. L. S. GOBLE said that any of the antiseptic oils would neutralize the action of the oxyphosphate, or rather of the phosphoric acid, which does the mischief. Oil of cloves is as good as anything, and only a very minute quantity would be required.

Dr. W. A. WHITE, Phelps, thought the discussion of this subject was like that of some theological questions which could not be settled. Some are sure that oxyphosphate will kill nine out of every ten pulps, while others teach that it is harmless. Dr. T. S. Waters, of Baltimore, taught years ago that oxyphosphate was well adapted to cap pulps, and Dr. White had used it for the purpose for years with good results.

Dr. OSGOOD said that the use of a minute disk of paper over the pulp would save it from the action of the oxyphosphate. He did not mean to say that it killed every pulp, but it did many.

(To be continued.)

## SOUTHERN CALIFORNIA DENTAL ASSOCIATION.

A MEETING was held in Los Angeles on June 23, 1898, by the dentists of Southern California for the purpose of organizing a dental society. About fifty members of the profession were present and organized the Southern California Dental Association, electing the following officers: Dr. W. A. Smith, Los Angeles, president; Dr. H. R. Harbison, San Diego, first vice-president; Dr. C. W. Sylvester, Riverside, second vice-president; Dr. J. M. White, Los Angeles, treasurer; Dr. L. E. Ford, Los Angeles, secretary.

The society will hold its first regular meeting in San Diego, Cal., on September 2, 1898.

L. E. FORD, D.D.S., *Secretary*,
118½ S. Spring st., Los Angeles, Cal.

# DENTAL COLLEGE COMMENCEMENTS.

## MILWAUKEE MEDICAL COLLEGE—DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the Milwaukee Medical College were held on April 5, 1898, at the Pabst Theater, Milwaukee, Wis.

Addresses were delivered by Professor W. H. Earles, B.Sc., M.D., Dean of the Medical Department, and George V. I. Brown, D.D.S., M.D., C.M., Dean of the Dental Department. The valedictory address was delivered by C. C. Wetherby, D.D.S.

The number of matriculates for the session was ninety-two.

The degree of D.D.S. was conferred on the following graduates by George V. I. Brown, D.D.S., M.D., C.M., dean:

| NAME. | STATE. | NAME. | STATE. |
|---|---|---|---|
| H. R. Abell | Wisconsin. | P. F. Mulholland | Wisconsin. |
| G. H. Carter | Wisconsin. | F. C. Runge | Wisconsin. |
| L. A. Gilfillan | Wisconsin. | W. B. Robinson | Wisconsin. |
| R. E. Goodhouse | Wisconsin. | W. G. Skewes | Wisconsin. |
| F. C. Hurd | Wisconsin. | D. Singer | Wisconsin. |
| P. Kleist | Wisconsin. | J. G. Schottler | Wisconsin. |
| G. G. Keller | Wisconsin. | C. C. Wetherby | Wisconsin. |
| G. W. Lyon | Wisconsin. | E. C. Wackler | Wisconsin. |
| W. T. Maynard | Wisconsin. | | |

## UNIVERSITY OF IOWA—DENTAL DEPARTMENT.

At the annual commencement exercises of the Dental Department of the University of Iowa, held in Iowa City, Iowa, in March, 1898, the degree of D.D.S. was conferred on the following graduates:

Isaac Barrera.
Frank N. Beam.
Frederick N. Bingham.
William O. Bradley.
Herbert B. Brock.
George Brooks.
Curtis H. Brown.
Sim C. Brown.
Joseph F. Calhoun.
Walter G. Crandall.
Walter A. Davis.
James B. Daugherty.
Julius C. Deetkin.
Hanna Dillinger.
George C. Eickelberg.
Cora L. Eichar.
Charles J. Fawkes.
Josiah B. Fickes.
John C. Gable.
Arthur G. Gary.
Charles W. Grafton.
George W. Godlove.
Robert W. Hall.
Clinton LeG. Hayes.
Mathias F. Henle.
Jennie Hirons.
Chas. D. Hollenbeck.
Guerne T. Hood.
Bird N. Hope.
Francis A. Johnson.
Walter T. Joslin.
Howard D. Keeler.
Jason D. Kinsley.
Nella M. Lambert.
Earnest J. Lawton.
Charles S. Leech.
Lloyd C. Leigh.
William O. Lillibridge.
Clayton B. Lindsay.
Freeman McClelland.
William B. McClanahan.
John W. McKee.
Herman J. Meis.
Wm. C. Miller.
Burton A. Morrow.
Mahlon D. Ogg.
Jefferson H. Patton.
William M. Read.
May Reynard.
James K. Rice.
Arthur H. Rundorff.
Wm. C. Sensibaugh.
Adelbert W. Starbuck.
Harry B. Sutton.
E. Fay Tinker.
Charles A. Torrance.
Frederick E. Truax.
John E. Webb.
William H. Weikert.
Frederick P. Wells.
George L. Wood.

## BOSTON DENTAL COLLEGE.

The thirty-first annual commencement exercises of the Boston Dental College were held in Berkeley Temple, Boston, Mass., on Wednesday evening, June 15, 1898.

The annual address was delivered by William H. Bolster, D.D., and the valedictory by A. L. Miles, D.D.S.

The degree of D.D.S. was conferred on the following graduates by J. A. Follett, M.D., dean of the college:

| NAME. | STATE. | NAME. | STATE. |
|---|---|---|---|
| Ernest H. Averill | Maine. | John V. Lawler | Massachusetts. |
| Henry M. Beckwith | Maine. | William A. Loud | Massachusetts. |
| C. W. Boutwell | Vermont. | A. P. Manchester | Rhode Island. |
| Edwin E. Browning | Massachusetts. | Arthur L. Miles | Massachusetts. |
| Henward Burbridge | Vermont. | Enos W. Moore | Connecticut. |
| Walter S. Burt | Vermont. | Edward Monahan | Massachusetts. |
| H. R. Chadwick | Vermont. | Janet G. North | Massachusetts. |
| Henry A. Colson | Massachusetts. | Harry B. Osgood | Massachusetts. |
| Willis L. Colson | Massachusetts. | Urbane P. Pierce | New Hampshire. |
| Robert W. Cram | Maine. | Otto B. Price | New Brunswick. |
| Robert E. Daly | Massachusetts. | Ernest F. Rice | Massachusetts. |
| John T. Donehue | Massachusetts. | H. M. Robbins | Maine. |
| H. B. Devereaux | Massachusetts. | Darius S. Roberts | Maine. |
| Thos. T. Estabrook | New Brunswick. | Albert W. Rogers | Massachusetts. |
| Charles A. Frank | Massachusetts. | Geo. C. Sanderson | Massachusetts. |
| Wm. S. Gee | Rhode Island. | Albert O. Sproul | Massachusetts. |
| L. G. Gorham | Massachusetts. | G. B. Squires, Ph.G. | Massachusetts. |
| Wilbur F. Hall | Massachusetts. | Burton W. Trask | Maine. |
| A. F. Hogan | Nova Scotia. | John J. Walsh | Massachusetts. |
| Arthur S. Hovey | Massachusetts. | Willis R. Webber | Massachusetts. |
| Chas. W. Howard | Massachusetts. | Erle Wightman | Massachusetts. |
| Agnes G. Kelley | Massachusetts. | W. F. Winchester | New Hampshire. |

## UNIVERSITY OF MICHIGAN—COLLEGE OF DENTAL SURGERY.

THE annual commencement exercises of the College of Dentistry were held, in connection with other departments of the University of Michigan, on Thursday, June 30, 1898.

The commencement oration was delivered by Benjamin I. Wheeler, LL.D.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

Roy Archbold.
Alfred Baldwin.
Richard E. Bloomer.
Walter H. Bowman.
Lyman S. Brown.
Francis C. Castell.
W. A. Chamberlain.
John F. Conley.
Joseph T. Davies, M.D.
James R. Davis.
James B. Doyle.
Robert N. Forbes.
Percy R. Glass.
Claude C. Goodes.
Richard B. Hamilton.
Milton J. Hardy.
Harold M. Herron.
Robert B. Howell.
Bessie Hutchinson.
Ulysses S. Jeffs.
George N. Kimball.
A. H. Kinmond.
Marc A. Kroupa.
Herbert E. Lehr.
F. J. H. Leland, D.D.S.
James McM. Loudon.
Chalmers J. Lyons.
Harry B. McMillan.
Edwin K. Medler.
S. A. D. Merchant.
Fred C. Miller.
James W. Minerd.
Guy R. Palmer.
Leslie W. Platt.
Lester G. Platt.
Thomas C. Reid.
John M. Rich.
Claude B. Roe.
Ralph J. Roper.
John H. Setzler.
Arthur B. Snow.
Joseph B. Stewart.
John H. Stofflet.
Arthur M. Sweet.
Daniel M. Thompson.
Fred G. Titus.
Thomas B. Van Horne.
Harry M. Viel.
Benjamin F. Vosburgh.
Philip E. Waugh.
Oliver W. White.
Benjamin Wolf, D.D.S.
Lewis D. Zinke.

The degree of Doctor of Dental Science was conferred on Thomas E. Carmody, D.D.S., and Dessie B. Robertson, D.D.S.

## HARVARD UNIVERSITY—DENTAL SCHOOL.

THE annual commencement exercises of the Dental School of Harvard University were held in Sanders Theater, Cambridge, Mass., on Wednesday, June 29, 1898.

The degree of Doctor of Dental Medicine was conferred on the following graduates by President Eliot, of the university:

Harry R. Allen.
E. H. C. Bailey, R.D.S.
F. W. Bailey, R.D.S.
Lawrence W. Baker.
Charles B. Burnham.
John A. Counter.
Joseph Daley.
Eliot T. Dickinson, B.S.
Giles Dowling.
Paul H. Duckworth.
Stewart C. Fisher.
Harry L. Grant, A.B.
Timothy Hanrahan.
Geo. H. Harding, L.D.S., R.C.S.
Ernest J. Hart.
J. Churchill Hindes.
Horace L. Howe.
Ernest B. Williams.
Evans A. Leonard.
W. S. Louisson, D.D.S.
Frank M. Lynde, A.B.
Michael F. McDermott, M.D.C.M.
J. N. Macdonald, L.D.S.
Elmer J. Marston.
Louis F. Mongeon.
Charles E. Murphy.
Wm. M. Parker.
James A. Richan.
Murdock C. Smith, M.D., D.D.S.
F. A. L. Schuckmann.
Frank B. Siears.
Wm. D. Squarebrigs.
W. H. Starratt, A.B.
John T. Timlin.
Albert E. Tuck.
Oliver P. Wolfe.

## COLLEGE OF PHYSICIANS AND SURGEONS OF SAN FRANCISCO—DENTAL DEPARTMENT.

The annual commencement exercises of this institution were held in Native Sons' Hall, San Francisco, Cal., on Thursday evening, July 14, 1898.

Addresses were delivered by Professor Melville B. Anderson, of Stanford University, and by Rabbi J. Nieto.

The number of matriculates for the session was thirty-three.

The degree of D.D.S. was conferred upon the following graduates by Professor J. R. Laine, M.D., president of the college: Ernest B. Boyes, Edward E. Brown, Marcellus E. Clarke, Aura T. Covert, Charles M. Griffith, Norman D. Kelley, George T. Milliken, Charles G. Noble, Herbert B. Ward, all of California.

# DENTAL SOCIETY ANNOUNCEMENTS.

## NATIONAL DENTAL ASSOCIATION.

The first annual meeting of the National Dental Association will be held at Omaha, Neb., commencing at 10 A.M. Tuesday, August 30, 1898.

Geo. H. Cushing, *Recording Secretary.*

N. B.—I wish to state, owing to the conflicting stories in circulation regarding lack of accommodations at Omaha, that I recently visited there to make a personal inspection of the hotels, and found the accommodations ample and rates reasonable.

J. N. Crouse, *Chairman Executive Committee.*

## NATIONAL ASSOCIATION OF DENTAL FACULTIES.

The annual meeting of the National Association of Dental Faculties will be held in the Hotel Mercer, at Omaha, beginning Friday, August 26, 1898, at 2 P.M. It is to be hoped that all members of the association will be present at that time.

The Executive Committee will meet on the preceding Thursday at 2 P.M.

Colleges are notified to present their business at the first session of the committee.

By order of JONATHAN TAFT, *Chairman Ex. Com.*,
B. HOLLY SMITH, *Sec'y.*

## MINNESOTA STATE DENTAL ASSOCIATION.

THE Minnesota State Dental Association will hold its fifteenth annual meeting in St. Paul, September 6, 7, and 8, 1898. The meetings will be held in the club rooms in the Endicott Arcade Building. An excellent program is assured. It being state fair week, there will be reduced rates upon all railroads. All dentists in and out of the state are cordially invited to attend.

H. L. CRUTTENDEN, *Secretary*,
Northfield, Minn.

## BI-STATE DENTAL MEETING.

THE bi-state dental meeting of the Northern Indiana and Southwestern Michigan Dental Societies will be held at Elkhart, Ind., on Wednesday and Thursday, September 21 and 22, 1898. This meeting promises to be one of unusual interest and profit. All members of the profession are cordially invited to attend.

F. P. ADAMS, *Sec'y Northern Ind. Dental Ass'n*,
Elkhart, Ind.

## LIST OF COMMITTEES

### FOR THE JOINT MEETING OF THE SOUTHERN BRANCH OF THE NATIONAL DENTAL ASSOCIATION AND THE LOUISIANA STATE DENTAL SOCIETY.

*Committee on Arrangements, in subdivisions. Transportation.*—Drs. Joseph Bauer, chairman, New Orleans, La.; Jules J. Sarrazin, New Orleans, La.; C. L. Alexander, Charlotte, N. C.; Ed. M. Kettig, Louisville, Ky. *Hotels and Quarters.*—Drs. J. Rollo Knapp, chairman, New Orleans, La.; Joseph Bauer, New Orleans, La.; Wallace Wood, Jr., New Orleans, La.; L. D. Archinard, New Orleans, La. *Hall, Exhibits, and Arrangements.*—Drs. L. D. Archinard, chairman, New Orleans, La.; Joseph Bauer, New Orleans, La.; Phil. Friedrichs, New Orleans, La.; Chas. Mermilliod, New Orleans, La.; A. J. Foret, New Orleans, La.

*Committee on Clinics* (Southern Branch N. D. A.)—Drs. T. P. Hinman, chairman, Atlanta, Ga.; J. Rollo Knapp, New Orleans, La.; R. K. Luckie, Holly Springs, Miss. (Louisiana State Dental Society.) Drs. And. G. Friedrichs, chairman, New Orleans, La.; J. F. Johnston, Ruston, La.; L. D. Archinard, New Orleans, La.

*Committee on Publication.*—Drs. Shep. W. Foster, chairman *ex-officio*, Atlanta, Ga.; E. P. Beadles, Danville, Va.; C. L. Alexander, Charlotte, N. C.

*Committee on Oral Hygiene.*—Drs. L. M. Cowardin, chairman, Richmond, Va.; S. W. Foster, Atlanta, Ga.; J. Percy Corley, Greensboro, Ala.; I.

Simpson, Rock Hill, S. C.; B. F. Arrington, Goldsborough, N. C.; J. N. Crouse, Chicago, Ill.; W. T. Arrington, Memphis, Tenn.; L. Augspath, Little Rock, Ark.; S. Dickson, Bolivar, Tenn.; E. F. Adair, Harmony Grove, Ga.; F. G. S. Gorgas, Baltimore, Md.

*Committee on Prosthetic Dentistry.*—Drs. J. A. Dale, chairman, Nashville, Tenn.; Geo. Evans, New York, N. Y.; Ed. Eggleston, Richmond, Va.; Albert B. King, Baltimore, Md.; W. H. Morgan, Nashville, Tenn.; J. G. Fife, Dallas, Texas; L. D. Carpenter, Atlanta, Ga.; W. H. Cook, Denton, Texas; J. L. Wolf, Washington, D. C.; Jas. S. Knapp, New Orleans, La.

*Committee on Orthodontia and Oral Surgery.*—Drs. Geo. Hardy, chairman, Baltimore, Md.; L. M. Cowardin, Richmond, Va.; A. R. Melendy, Knoxville, Tenn.; J. E. Orrison, Baltimore, Md.; W. W. Corley, Talladega, Ala.; H. Marshall, Atlanta, Ga.; Jules J. Sarrazin, New Orleans, La.; E. P. Keerans, Charlotte, N. C.; R. C. Young, Anniston, Ala.; F. L. Wood, Roanoke, Va.; Wm. J. Younger, Chicago, Ill.

*Committee on Operative Dentistry.*—Drs. J. G. Fife, chairman, Dallas, Texas; A. P. Johnston, Anderson, S. C.; J. Edwin Boozer, Baltimore, Md.; J. E. Orrison, Baltimore, Md.; B. Holly Smith, Baltimore, Md.; H. D. Boyd, Troy, Ala.; E. L. Hunter, Fayetteville, N. C.; L. A. Smith, Port Gibson, Miss.; Sam. Rambo, Montgomery, Ala.; C. Sill, New York, N. Y.; J. M. Quattlebaum, Columbia, S. C.; W. H. Burr, Madison, Ga.

*Committee on Chemistry, Metallurgy, and Anatomy.*—Drs. Albert B. King, chairman, Baltimore, Md.; J. H. Benton, New Berne, S. C.; M. C. Marshall, St. Louis, Mo.; B. H. Teague, Aiken, S. C.; Chas. S. Grindall, Baltimore, Md.; B. J. Quattlebaum, Winnsboro, S. C.; W. H. Ewald, Portsmouth, Va.

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C. L. Alexander,
*Cor. Sec'y Southern Branch National Dental Association.*

# EDITORIAL.

## PROFESSIONAL JOURNALISM.

The New York Institute of Stomatology devoted its May meeting to the consideration of certain phases of professional ethics, and among other problems professional journalism came in for its share of investigation and discussion. The meeting was apparently a symposium at which opportunity was given for the airing of opinions as to the conditions and factors which their authors believe to be at the foundation of certain retrogressive tendencies which, from their point of view, are hampering and stifling the growth of professional spirit. The major portion of the July issue of the *International Dental Journal* is devoted to the report of the meeting, and the editor of that journal gives considerable space to a summary of his views on the subject. We have been favored with a reprint of the report and also with a copy of a circular letter inviting our co-operation in advancing the interests of professional dental journalism, signed by the president and the secretary of the Institute of Stomatology. In the circular noted we are entreated "to support by all means in our power the journals we have, not owned by supply houses, to the end that they may be made stronger, and have the means to do their work of spreading knowledge and building up professional moral character more effectually."

The reason for this appeal is contained in a preamble which recites that "our periodical literature cannot subserve its highest function if owned by manufacturing and supply houses, notwithstanding their enterprise, because their interests are not always identical with all lines of professional advancement."

We are impelled to critically examine some of the views and statements expressed in the matter referred to for two reasons: viz, it is an important question in itself; and, secondly, it involves the policy and motives of the editor of this journal in the conduct of his professional and editorial work.

It is evident that the sense of the meeting was an expression of the belief of its members that a crying need of the profession is a professional dental journal, and in that belief we are in hearty and harmonious accord. But we are not at all clear as to just what some of the disputants mean by the term professional as applied to a journal. In some instances it seems to mean a journal owned by the profession; in others a journal conducted in harmony with the generally accepted principles of professional ethics; in still others both of these factors together: but whatever may be the content of the definition in the minds of those who took part in discussion of the subject, there can be no doubt of the unanimity of sentiment among the group of men in question that a professional journal owned by a dental supply house is an ethical impossibility. To that conclusion we take exception, and we offer the DENTAL COSMOS, under its present editorship, in each and every one of its issues from cover to cover, as proof to the contrary. From the beginning of his connection with the DENTAL COSMOS the editor has conscientiously refrained from any allusions of a personal character affecting his relations to or policy concerning the journal. He has been content to exert his best efforts toward producing a publication which was in harmony with his ideal of what a high-class professional dental journal should be, in so far as his abilities and the means at his command would permit. He was fully aware of the existence of a strongly opposing sentiment among certain representative men in dentistry toward journals capitalized by supply houses. Nevertheless he believed, and still believes, that a strictly ethical journal receiving its financial support from a supply house is not at all a practical impossibility. On the contrary, and especially because of the continued failure of the efforts which have been earnestly and persistently put forth to obtain directly from the dental profession the financial support absolutely necessary to secure the maintenance of a strictly high-class dental periodical, it was believed that the financial backing of an honorable dental manufacturing concern could be utilized to accomplish the same object, provided that the business interests of the company and the editorial management of the journal could be absolutely separated. It was upon that basis that the editorial management was undertaken and has been carried out. The editor saw in the plan an opportunity to furnish the dental profession with a journal which would to some degree be the material expression of our high professional status, that the opportunity could be utilized as a power for professional good; and whether it has done so or not, whether it has failed in the attainment of the ends noted or fallen short, the result is chargeable alone to the editorial management in the light of that belief.

We are in cordial sympathy with any legitimate effort the profession may make toward the attainment of higher professional ideals, but we ask that in the effort toward better things we be accorded exemption from charges of selfishness, the greed for gain, the bartering of professional honor for money, that trade interests directly or remotely in any degree whatsoever influence our editorial work, and like unethical acts and motives, even by implication, which have been so freely indulged in by some of the professional gentlemen in their discussion of this topic at the New York Institute of Stomatology.

It is an axiom of ethics of more venerable antiquity than any of its later special developments, that "thou shalt not bear false witness against thy neighbor," and the interpretation of that maxim among those of the highest ethical class includes a natural repugnance toward imputing dishonorable or ulterior motives in the absence of a sufficient basis of fact. That such implications have been made by a body of men professedly, and we believe actually, animated by the highest ethical motives we can only comprehend in the belief that they have spoken from an imperfect knowledge of the facts or an erroneous understanding of them. If such be the case, and in any event, we would suggest to those interested that before they consider the case closed and ready for the jury of professional opinion they take pains to inform themselves more fully in the endeavor to learn the whole subject, to the end that justice be done and that truth shall prevail.

And now as to the prospective and ideal professional journal, that which is to express the highest aspirations of ethical dentistry and be the repository of its ripest intellectual results. We will hail its appearance with joy; but let it be free from the degenerating influence of trade, let it draw its financial sustenance from the contributions of an appreciative profession who without selfishness will promptly liquidate its annual deficit. Let no advertisements mar its pages, to detract from the interest of its text or stand as the material evidence of its dependence upon trade for the sinews of its work. Or, if there must be advertisements, let them be of such a character as to pass the censorship of the American Academy of Dental Science. Let it be provided with a fund for the adequate compensation of authors who, having devoted their time, energy, ability, and money in the prosecution of original investigation, and who may therefore be adjudged as having done their full share for professional advancement, are entitled to a fair honorarium for the publication of their results in the most attractive manner which they can accept without laying themselves open to the charge of having bartered their professional work for gain. And from the same fund let a generous portion be set aside for the compensation of the editor; he is likely to be human, and therefore will have human needs. In fact, the higher his intellectual fitness for his work the more manifold and therefore more expensive his needs; and if he is to do his work well it will pay the profession to see that he is well cared for. The editor of this journal is interested in forwarding such a movement, and will contribute as he has heretofore to its financial encouragement; but until there is a reasonable hope that past experiences in this direction will not be repeated, or he has more positive assurance than is now apparent that it will receive a professional support sufficient to warrant the undertaking with a fair hope of success, he will continue to utilize the means at his command to accomplish a result not altogether unlike that suggested.

## AGAIN. THE NEW JERSEY DENTAL LAW.

THE Secretary of the New Jersey Dental Commission takes exception to our criticisms of the recently enacted dental law of New Jersey, which were editorially published in the May issue of this journal. His retort—it is not an answer—appears at page 638 of this issue.

He takes us to task for not calling attention to the strong point of the law, which is the newly added preliminary educational clause. Though we were discussing its weak points, not its strong ones, we apologize for the omission, and hasten to state as our opinion that the clause referred to is an admirable feature, one which we hope to see in effect added to the dental law of every state in the Union. It is decidedly an advance on right lines, one which will help to elevate dental standards and will tend to do just what we have believed a dental law should do—"protect the public against the ministrations of incompetent practitioners and act still further as a wholesome corrective of the tendency upon the part of the colleges to graduate incompetent men." It is not only an admirable feature in itself, but its execution is intelligently provided for by being relegated to the "personal supervision of the State Superintendent of Public Instruction, who has the entire control," etc.

It is a somewhat striking coincidence that the best thing in the law is the only feature over which the board has no control whatever.

We are glad to have so clear an explanation of the function of the clause permitting examination of an applicant upon recommendation of five registered New Jersey dentists. It appears now that the dental profession of New Jersey had nothing to do with its introduction, and that it is merely an effort of the Senate of that state to encourage the immigration of college professors without degrees from other states; and we can now see, as we did not before, that it is not an unmixed evil. We are further obliged for the information that the dentists of New Jersey did not make the dental law of that state, and are inclined to believe it would have been better done had it been in their power to do so. We apologize again for even supposing that they were concerned in it.

As to the charges that we have "attacked the integrity of the chief executive" of New Jersey, or that there is anything in our criticism of the student clause favoring retroactive legislation, we leave to the judgment of all competent members of the profession to decide for themselves from the evidence before them.

Two points our corresponding Secretary tacitly acknowledges his inability to understand,—viz, (1) the similarity between certain features of the New Jersey law and those of the old Pennsylvania law; and (2) how the standard of dental education could be specified in the New Jersey law.

We will try to clarify the matter once more. The common factor as between the old Pennsylvania law and the present New Jersey law is that each confers upon the board the power to conduct an examination for license to practice, gives them unlimited discretion as to the character and scope of said examination, but makes no provision that any one outside the board *shall by law have the right to know* to what kind of treatment the applicant has been subjected. As to how justice to the applicant may be secured we refer to the existing laws of Pennsylvania, both for dentistry and for medicine, and to the same enactments for information as to how the plan and scope of the professional standard may be specified in the law.

We desire to further explain to the Secretary of the New Jersey Dental Commission that, notwithstanding the somewhat pyrotechnic character of his tart communication, our interest in this matter is general and not personal, and that we hope by occasional agitation of the subject to see the tendency of dental legislation take a course more equitable to the applicant and create boards whose every official act shall be open to inspection, as has already happened in a few states. Then and not until then will the foundations of uniform legislation be secured, and examining boards command the full confidence of the profession and secure their unanimous support.

## THE EXCURSION TO THE MEETING AT OMAHA.

As intimated in our July issue, a movement has been made toward arranging for a special excursion to the National meeting at Omaha, so that delegates from the Eastern and New England states could make the trip together and by special train.

Owing to certain uncontrollable delays the arrangements have not been fully perfected at the date of our going to press.

It may, however, be stated that the effort to attain the end noted is still in progress, and the general plan at this time is to make Buffalo the gathering point, proceeding thence to Chicago by the Nickel-Plate line and from Chicago to Omaha by Chicago, Milwaukee and St. Paul Railroad. Members from Philadelphia and vicinity will probably take the Lehigh Valley Railroad to Buffalo.

The Central Traffic Association has not as yet made a rate, so that details as to cost of transportation are lacking. The rate and other details will doubtless be fixed at an early date, and we ask that all in the vicinity of Philadelphia who desire to take advantage of the opportunities for a pleasant social time which the excursion will afford, will forward their names and addresses to the editor of the DENTAL COSMOS as soon as possible.

## CROWDED PAGES.

THE July number of the DENTAL COSMOS contained sixteen extra pages of reading matter, and the current issue has eight extra pages; notwithstanding which we are obliged to omit much valuable matter already in type, together with reviews of Barrett's "Oral Pathology and Practice," and the new edition of Guilford's "Orthodontia," intended for this number.

# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

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The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

**Gorgas** (Ferdinand J. S.) Dental medicine: a manual of dental materia medica and therapeutics; sixth edition, revised and enlarged. Phila., 1898, Blakiston, Son & Co., 592 p. 8°.

**Hirschfeld** (W.) Etude sur la carie dentaire et son traitement par le plombage. Par., 1898, J.-B.-Baillière et fils, 48 p. 8°.

**Maire** (E.) L'erosion dentaire. Par., 1898, J. B. Baillière et fils, 76 p. 8°.

**Tomes** (Charles S.) A manual of dental anatomy, human and comparative. 5. ed. Phila., 1898, P. Blakiston, Son & Co., 596 p. 8°.

---

**Ambler** (H. L.) Filling the anterior teeth of children with tin. Ohio Dent. J., Toledo, 1898, xviii, 266–268.—**Anderson** (D. A.) Making partial indentures. Atlanta Dent. J., 1897, iii, 72.—**André.** Kyste hydatique de la glande sous-maxillaire. Bull. Soc. anat. de Par., 1898, lxxiii, 264–267.—**Aronson** (E.) Injury of the cavum pharyngeum; report of a case. J. Am. M. Ass., Chicago, 1898, xxx, 1210.—**Barrett** (A. W.) Concerning the agreement that may be drawn up between a dental practitioner and his assistant. J. Brit. Dent. Ass., Lond., 1898, xix, 291–296.—**Barton** (W. M.) Some points in the ether-chloroform controversy. Dental News, Wash., D. C., 1897, i, 52–56.—**Bauchwitz** (M.) Obturator bei einem achtjährigen Mädchen nach einer Oberkieferresection wegen Osteosarkoms. Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 267–269.—**Baudet** (R.) Le mal perforant buccal. [Abstr.] Gaz. hebd. de méd., Par., 1898, n. s., iii, 493–495.—**Baumgarten** (E.) Keményszájpad-fekélyek. [Ulcer of hard palate.] Orvosi hetil., Budapest, 1898, xlii, 232.—**Béclère** (A.) Orchite ourlienne d'emblée, sans tuméfaction des glandes salivaires chez un garçon de quinze ans. J. de clin. et de thérap. inf., Par., 1898, vi, 454.—**Beers** (W. G.) Diagnostic errors. Dominion Dent. J., Toronto, 1898, x, 205–209.—**Berndt** (F.) Ueber Auswüchse der modernen Wundbehandlung. J. f. Zahnheilk., Berl., 1898, xiii, no. 20.—**Bickel** (O.) A step-child of dentistry. Items Interest, N. Y., 1898, xx, 409.—**Biró** (S.) Ueber die prädisponirenden Ursachen der Caries mit besonderer Berücksichtigung der Untersuchungen Black's und William's. J. f. Zahnheilk., Berl., 1898, xiii, no. 19.—**Black** (G. V.) Dr. Black's conclusions reviewed again. Dental Cosmos, Phila., 1898, xl, 440–451. ——— Instrument nomenclature with reference to instrumentation. Second part—formula names. Dominion Dent. J., Toronto, 1898, x, 192–205.—**Bonnard** (E.) L'orthoforme et le chlorhydrate d'orthoforme en art dentaire. Odontologie, Par., 1898, 2. s., v, 385–393.—**Borbély** (S.) A cocain és anesin anæstheticus alkalmazása a sebeszetben s a Schleichféle eljárás. [The employment of cocaine and anesin anæstheticus in surgery and the proceeding of Schleich. Gyógyászat, Budapest, 1898, xxxviii, 281; 301.—**Brandt** (W. J.) Ulcerating nævus of the lip in a child producing harelip; spontaneous cure. Brooklyn M. J., 1898, xii, 384.—**Brault** (J.) Leucoplasie et épithélioma primitif de la voûte palatine chez un ancien syphilitique. Ann. de dermat. et syph., Par., 1898, 3. s., ix, 364–366. ——— Macroglossie; lymphangiectasies du plancher de la bouche et des régions cervico-faciales, amputation conoïde de la langue; fonctions lymphangiomes; présence du pneumocoque, guérison; résultats éloignés. Ann. d. mal. de l'oreille, du larynx [etc.], Par., 1898, xxiv, 481.—**Brocq** (L.) **et L. Bernard.** Etude sur le lymphangiome circonscrit de la peau et des muqueuses; à propos d'un cas de lymphangiome circonscrit de la cavité buccale. Ann. de dermat. et syph., Par., 1898, 3. s., ix, 305–334, 1 pl.—**Browne** (L.) Sur quelques particularités anatomiques ayant traite à la pathologie de l'amygdale linguale. Rev. hebd. de laryngol. [etc.], Par., 1898, xviii, 673–685.—**Bruce** (H.) The surgical treatment of osseus ankylosis of the temporo-maxillary articulation. Canada Lancet, Toronto, 1897–8, xxx, 472–474.—**Bruck** (W.) Ueber die neuen Jenkins'schen Porzellanemaillen. Deutsche Monatschr. f. Zahnh., 1898, xvi, 241–249.—**Bulkley** (L. D.) Manifestations of syphilis in the mouth. Dental Cosmos, Phila., 1898, xl, 431–435.—**Burchard** (H. H.) The nerve and blood supply of the dental pulp. Items Interest. N. Y., 1898, xx, 401–404.—**Caush** (D. E.) Is Nasmyth's membrane modified cementum? J. Brit. Dent. Ass., Lond., 1898, xix, 296.—**Clayton** (J. R.) Noncohesive gold, tin and tin-gold. Indiana Dent. J., Indianap., 1898, i, 515–524.—**Coulhon** (P.) La bouche et les levres; leurs affections ulcéreuses; un cas d'ulcérations labiales. Gaz. d. hôp., Par., 1898, lxxi, 588–593.—**Creasota** é iodo en el trata-miento de abcesos. Rev. dental. amer., Phila., 1898, vi, 81.—**Cristini** (P. D.) Tumore linguale diagnosticato e guarita mediante la iniezione intramuscolare di calomelano. Gazz. med. lomb., Milano, 1898, lvii, 181.—**Cunningham** (G.) The "dummy patient," or students' practising ground. Dental Rec., Lond., 1898, xviii, 249–251.—**Curtis** (B. F.) Cyst of Nuhn's or Blandin's glands in the tongue. Ann. Surg., Phila., 1898, xxvii, 662.—**Darin.** Introduction de substances médicamenteuses dans l'economie à l'aide du courant galvanique. Rev. odont., Par., 1898, xvii, 208–215.—**Davis** (L. F.) Local anesthetics. Dental News, Wash., D. C., 1897, i, 41–43.—**Desarrolo** (El) de los dientes y sus alveolas. Rev. dent. amer., Phila., 1898, vi, 90–96.—**Duchateau-Frentz** (A.) Une des causes de la névralgie faciale. Presse méd. belge, Brux., 1898, l, 177.—**Duplay.** Enchondrome de la parotide. Gaz. d. hôp., Par., 1898, lxxi, 609–610.—**Escat** (E.) Pathologie de l'amygdale linguale et de la base de la langue [Rap.]. Rev. internat. de rhinol., otol. et laryngol., Par., 1898, viii, 449–493.—**Falero** (J.) Contagious phagedenic gingivitis. Dental Cosmos, Phila., 1898, xl, 456–458.—**Ferris** (H. C.) The legal and ethical limit of constitutional teatment in dentistry. Items Interest, N. Y., 1898, xx, 419–425.—**Finlay** (M. F.) Opening the bite with cap fillings without destroying the vitality of the pulps of the teeth. Dental News, Wash., D. C., 1897, i, 65.—**Förberg** (E.) The carbonized cotton method. Indiana Dent. J., Indianap., 1898, i, 552–558.—**Foster** (H.) Report of a case of lipoma of the tongue. Laryngoscope, St. Louis, 1898, iv, 347.—**von Friedländer** (F.) Zur Technik der Neurectomie des zweiten Trigeminusastes. Deutsche Ztschr. f. Chir., Leipz., 1898, xlviii, 307–312.—**Frohmann** (D.) Zur Symptomatologie und Diagnose des acuten nicht eitrigen Katarrhs der Kieferhöhle. Therap. Monatsh., Berl., 1898, xii, 258–262.—**Gallozzi.** Epitelioma della lingua; indicazione dell'intervento chirurgico; metodi operatorii. Rev. di chir., Napoli, 1898, i, 138–141.—**Guillot** (G.- F.- V.) Les extractions dentaires chez les femmes grosses. Odontologie, Par., 1898, 2. s., v, 399–403.—**Hart** (A. C.) Formalin. Pacific Medico-Dental Gaz., San Fran., 1898, vi, 226–233.—**Haury.** Néoplasie labiale de nature indéterminée. Ann. de dermat. et syph., Par., 1898, 3. s., ix, 344.—**Hawthorn** (H. W. J.) Hints on extraction of teeth. Brit. J. Dent. Sc., Lond., 1898, xli, 485–502.—**Hinman** (H. B.) A method of making bicuspid and molar crowns. Ohio Dent. J., Toledo, 1898, xviii, 268.—**Hodson** (J. F. P.) Contour slip matrices. Dental Cosmos, Phila., 1898, xl, 452–454.—**Hopkins** (S. A.) A peculiar mouth bacterium. J. Bost. Soc. M. Sc., 1897–8, ii, 163–166, 1 pl.—**Howatt** (A. B.) The presence of arsenic in cements. Dental Rev., Chicago, 1898, xii, 431–433.—**Howe.** Kronen und Brücken. Zahntech. Reform, Berl., 1898, xviii, 40–42.—**Hunt** (R. F.) Duties of dentists. Dental News, Wash., D. C., 1897, i, 39–41.—**Kells** (C. E.) Combination fillings of gold and amalgam. Items Interest, N. Y., 1898, xx, 405–409.—**Kirstein** (A.) Ein Nageltroicart für die Oberkieferhöhle. Illust. Monatschr. d. ärztl. Polytech., Berl., 1898, xx, 75.—**Klotz** (H. G.) Unangenehme Nebenwirkungen bei der Quecksilberbehandlung der Syphilis: Auftreten heftiger Stomatitis mercurialis unter dem Einfluss localer Infections-krankeiten der Halsorgane. Arch. f. Dermat. u. Syph., Wien u. Leipz., 1898, xliii, 416–420.—**Lack** (H. L.) A case of pharyngeal nystagmus, with remarks on similar affections of the pharynx and larynx. Laryngoscope, St. Louis, 1898, iv, 335–339.—**Léger-Dorez** (H.) Email fusible en art dentaire. Progrès dent., Par., 1898, xxv, 129.—**Lermoyez** (M.) Les paralysies du voile du palais et le nerf facial. Presse méd., Par., 1898, 241–243.—**Libby** (H. F ) A method of inserting gold fillings with the use of hand burnishers, as practiced exclusively for twenty years. Dental Cosmos, Phila., 1898, xl, 421–431.—**Lob** (G. E.) Failures in cataphoresis. Dental Rev., Chicago, 1898, xii, 417–431.—**Marchal.** Eléphantiasis de la langue; amputation partielle; guerison. Gaz. méd. de Picardie, Amiens, 1898, xvi, 82.—**de Marion** (G.) Le formal géranié en thérapeutique dentaire. Odontologie, Par., 1898, 2. s., v, 351–360.—**Martin** (C.) De l'enseignement de l'art dentaire en France. Rev., odont., Par., 1898, xvii, 197–202.—**Masini** (G.) Effetti dell'estratto di tonsille sul sistema cardio-vascolare. Clin. med. ital., Milano, 1898, xxxvii, 319–322.—**Mears** (J. E.) Temporo-maxillary ankylosis. Ann. Surg., Phila., 1898, xxvii, 672–676.—**Meisburger** (L.) Surgical treatment of alveolar abscess. Dental Cosmos, Phila., 1898, xl, 454–456.—**Mills** (W. A.) How and why we treat and fill root canals; our way. Dental News, Wash., D. C., 1897, i, 56.—**Minich** (K.) Ulcus tuberculosum linguæ. Orvosi hetil., Budapest, 1898, xlii, 270.—**Mitchell** (H. B.) Malposed molars as bridge piers. Ohio Dent. J., Toledo, 1898, xviii, 257–260.—**Mongour.** De la non-existence d'une stomatite spécifique distincte, dite stomatite diphtéroide. [Rap. de Rendu.] Bull. Acad. de méd., Par., 1898, 3. s., xxxix, 564–571.—**Müller** (E.) Goldkronen, Kapselstiftzähne und abnehmbare Brückenarbeiten. Zahntechn. Rundschau, Berl., 1898, 4472; 4491; 4511.—**Neeley** (J. H.) Death from an abscessed tooth. Ohio Dent. J., Toledo, 1898, xviii, 264.—**Ollendorff** (A.) Ueber den Zusammenhang der Schwellungen der regionären Lymphdrüsen zu den Erkrankungen der Zähne. Deutsche Monatschr. f. Zahnh., 1898, xvi, 249–265.—**Ottofy** (L.) The passing of the foot power. Dental Rev., Chicago, 1898, xii, 433–436.—**Palmer** (E.) Irregularities of the human teeth: some causes and remedies. Pacific Medico-Dental Gaz., San Fran., 1898, vi, 217–226.—**Palmer** (S. B.) Gingivitis and its relation to crown work. Dominion Dent. J., Toronto, 1898, x, 185–192.—**Partsch.** Ersatz des Unterkiefers nach Resektion. Zahnärztl. Rundschau, Berl., 1898, 4471.—**Phillips** (E. J. M.)

Notes on extraction of teeth. Dental Rec., Lond., 1898, xviii, 193-200.—**Phillips** (W. C.) Primary epithelioma of the antrum of Highmore, with history of a case, and two camera lucida drawings. [Abstr.] J. Med. & Sc., Portland, 1897-8, iv, 279.—**Polyák.** Mit Hilfe der Langenbeck'schen Temporärresektion operirter Fall eines von der rechten Kieferhöhle auf die rechte untere Muschel ausgebreiteten Sarcoms. Pest. med.-chir. Presse, Budapest, 1898, xxxiv, 440. —**Port.** Zahnfracturen durch indirecte Gewalt. Deutsche Monatschr. f. Zahnh , 1898, xvi, 265.—**Price** (W. A.) Electrolytic products of dental medicines. Ohio Dent. J., Toledo, 1898, xviii, 260-264.—**Prideaux** (W. de C.) A few notes on matrices. Dental Rec., Lond., 1898, xviii, 200-204.—**Pynchon** (E.) The submerged tonsils. Internat. J. Surg., N. Y., 1898, xi, 162-166.—**Rhein** (M. L.) Rational treatment of the dental pulp. Items Interest, N. Y., 1898, xx, 411-419.—**Richardière** (H.) Sur la gangrène primitive du pharynx. Bull. méd., Par., 1898, xii, 457-462.—**Richardson** (C. W.) Diseases of the antrum. Dental News, Wash., D. C., 1897, i, 91-95.—**Ripault.** Expulsion spontanée d'un corps étranger très volumineux du sinus maxillaire. Ann. d. mal. de l'oreille, du larynx [etc.], Par., 1898, xxiv, 454.—**Ritter** (P.) Einige praktische Winke für Operationen in der Narkose. Zahnärztl Rundschau, Berl., 1898, 4491.—**Roy** (D.) Peritonsillar abscess. Laryngoscope, St. Louis, 1898, iv, 349-356.—**Roy** (M.) Les contre-indications de l'anesthésie locale. Odontologie, Par., 1898, 2. s., v, 394-399.—**Roussel** (J. N.) Hallucinations of the gustatory sense excited by hyoscyamin. N. Orl. M. & S. J., 1897-8, l, 712-714.—**Rushton** (W.) The use of gutta-percha in conservative dentistry. Brit. J. Dent. Sc., Lond., 1898, xli, 433-448.—**Rushton** (W.) A few notes on the new pharmacopœia. *Ibid:* 481-485.—**Saloga** (A.) Eucain in der zahnärztlichen Praxis. J. f. Zahnheilk., Berl., 1898, xiii, no. 18.—**Sanchez** (J.) Mutilaciones dentarias. Gac. méd., Mexico, 1898, xxxv, 201-204, 1 pl.—**Scheuer** (A.) Dolor post extractionem dentis. Prag. med. Wchnschr., 1898, xxiii, 259.—**Seifert** (O.) Die Syphilis der Zungentonsille. Arch. f. Dermat. u. Syph., Wien u. Leipz., 1898, xliv, 213-245.—**Snyder** (J. B.) Method of bridge-work. Ohio Dent. J., Toledo, 1898, xviii, 265.—**Stirling** (A. W.) Empyema of the maxillary antrum. Laryngoscope, St. Louis, 1898, iv, 342-346.—**Sudduth** (X. V.) The nerve and blood supply of the dental pulp. Items Interest, N. Y., 1898, xx, 404.—**Sutton** (B.) Excision of the Gasserian ganglion. Med. Press & Circ., Lond., 1898, n. s., lxv, 549. —**Taft** (C. H.) The amalgam question and dentists with "Yankee wit." Internat. Dent. J., Phila., 1898, xix, 344-355.—**Talbot** (E. S.) Studies in evolution. *Ibid:* 357.—**Thompson** (H. C.) The use of tempered air and chloroform for hypersensitive cavities. Dental News, Wash., D. C., 1897, i, 78-80.—**Toeplitz** (M.) Mycosis pharyngis leptothricia. N. York M. J., 1897, lxvii, 885-889.—**Trueman** (W. H.) The dawn of modern dental literature. Internat. Dent. J., Phila., 1898, xix, 333-344.—**Turnbull** (F. J.) Porcelain work. Brit. J. Dent. Sc., Lond., 1898, xli, 448-457.—**Vajna** (V.) Biztonsági fogidegtük. [Safety needles for the dental nerves.] Gyógyászat, Budapest, 1898, xxxviii, 298; 314.—**Weisse** (F. D.) Buccal manifestations of syphilis. Dental Cosmos, Phila., 1898, xl, 436-440. —**Werkenthin** (A.) Erfahrungen und Betrachtungen über das Zimmet-Oel. Zahnärztl. Rundschau, Berl., 1898, 4511. —**Wheeler** (N. H.) An eternal cement. Dental Brief, Phila., 1897-8, ii, 641-643.—**White** (J. A.) Operations under local anæsthesia; experiences of the Richmond (Va.) eye, ear and throat infirmary. Bi-month Bull. Univ. Coll. Med., Richmond, 1898, iii, 372-375. ——— Dental plate, with central incisor attached, impacted in œsophagus three months, removed per vias naturales. *Ibid:* 381-383.—**Whitehouse** (A. L.) Some notes on odontoblasts. Dental Rec., Lond., 1898, xviii, 247-249.—**Wolfenden** (A. B.) Cataphoresis. *Ibid:* 241-247.—**Worcester** (J. W.) Serration an error in practice. Internat. Dent. J., Phila., 1898, xix, 355-357.—**Zentler** (A.) Un cas de triple réimplantation. Odontologie, Par., 1898, 2. s., v, 347-349.—**Zula.** Expériences cliniques relatives au traitement de la carie du 3e degré. Rev. odont., Par., 1898, xvii, 202-204.

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# LIST OF UNITED STATES PATENTS

## PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING JUNE, 1898.

*June 7.*—No. 605,171, to Francis S. Avil. Dental plugger.
" " No. 605,223, to John H. Gartrell. Apparatus for swaging dental plates.
" " No. 605,255, to Mont C. Merker. Dental chair.
" " No. 605,403, to Chas. A. Davis and Emory L. Townsend. Dental bridge-work.
" *21.*—No. 605,974, to F. Ritter. Dental chair.
" *28.*—No. 606,198, to Warren R. Evans. Dental base-plate.
" " No. 606,456, to Chas. Harnden. Dental mouth-mirror.
" " No. 606,460, to Jas. W. Ivory. Dental matrix-retainer.
" " No. 28,934, to Henry W. Gillett. Dental separator. Design.

THE

DENTAL COSMOS.

VOL. XL. PHILADELPHIA, SEPTEMBER, 1898. No. 9.

# ORIGINAL COMMUNICATIONS.

## THE HISTOLOGY OF CEMENTUM.

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(Read before the Dental Society of the State of New York, May 11 and 12, 1898.)

AN understanding of the histological character of the cemental tissue is essentially of little importance, but the complexity of the structure affords a good field for investigation, and, as one of the tooth-tissues, deserves further cultivation. Most of the literature upon the subject appears to be fully satisfied by referring to the structure of the cementum as being closely related to the osseous tissue in general, both in the mode of its generation and its physical and chemical characteristics. In the process of development, if we consider the tooth-pulp a Haversian canal, and the dentinal tissue as endochondral bone, the cementum will correspond to the cortical layer or perichondral bone. The similarity of the two structures is further increased by the cemental lamination, corresponding to the concentric lamellæ about the Haversian canals in true bone. But the generation of cementum while thus in a measure corresponding to subperiosteal bone development, differs in many respects from it, and results in a structure vastly different in character.

In the process of cementification, the cementoblasts, while performing a function similar to that of the osteoblasts in ossification, are very unlike these cells in outline (Black), the former inclining to the oval shape, while the latter are irregular in contour and decidedly flattened and scale-like. The position occupied by the cementoblasts, that of being crowded between the fibers of the alveolo-dental periosteum as they pass from the periphery of the cementum to the alveolar wall, appears in a measure to be responsible for their apparently distorted form.

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*Illustrated with lantern slides by the author.

Histologically considered, the structure of cementum, like that of ordinary osseous tissue, consists of a gelatinous basal substance, combined with the salts of lime, lacunæ and their accompanying prolongations, canaliculi. The matrix in general is so nearly identical to that of bone that it is with some difficulty that they are distinguishable. By decalcification it retains its form and structure, and by the intimate blending of organic and inorganic substances it is provided with hardness, solidity, and elasticity. It was my original purpose to treat the subject from two general standpoints, normal and abnormal, in both of which the nature of the cement-corpuscles, the cement-fibers, the laminations, and the general character of the ground-substance show a marked diversity. For lack of time I am obliged to adhere to the first part of my text only, that of the normal tissue.

Fig. I.

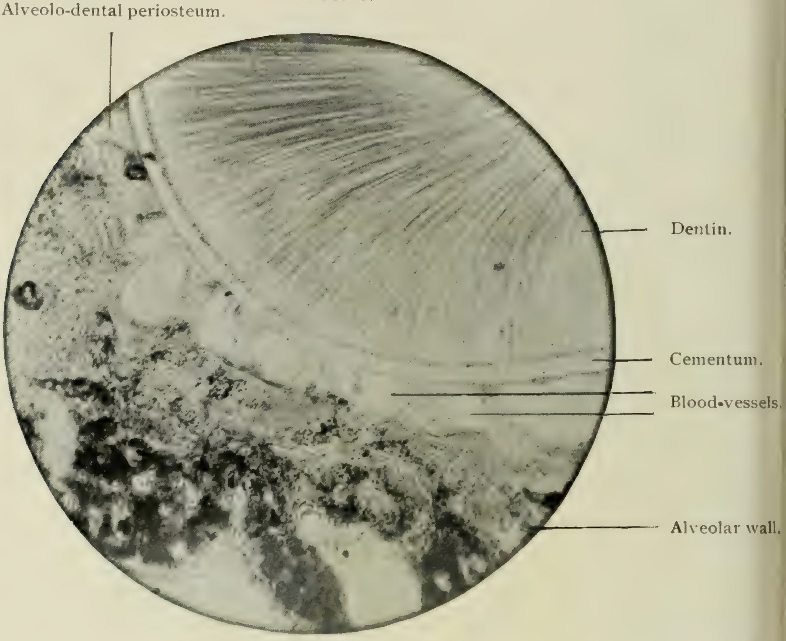

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Fig. 1 represents a transverse section through the jaw of an adult, and is introduced to show the environment of the tissue under consideration. The section is from the region of the cervix, and is shown under low power.

We will first take up the study of the tissue at different periods of its existence. The striated markings shown at *a* in Fig. 2 have

FIG. 2.

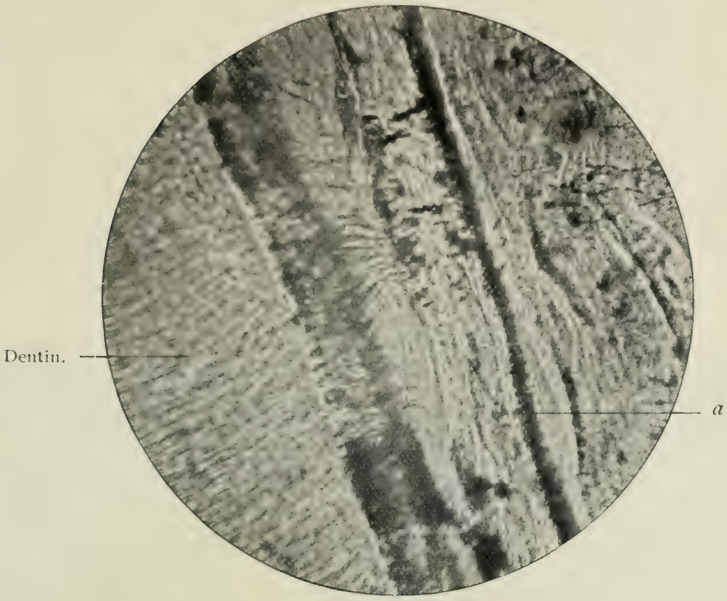

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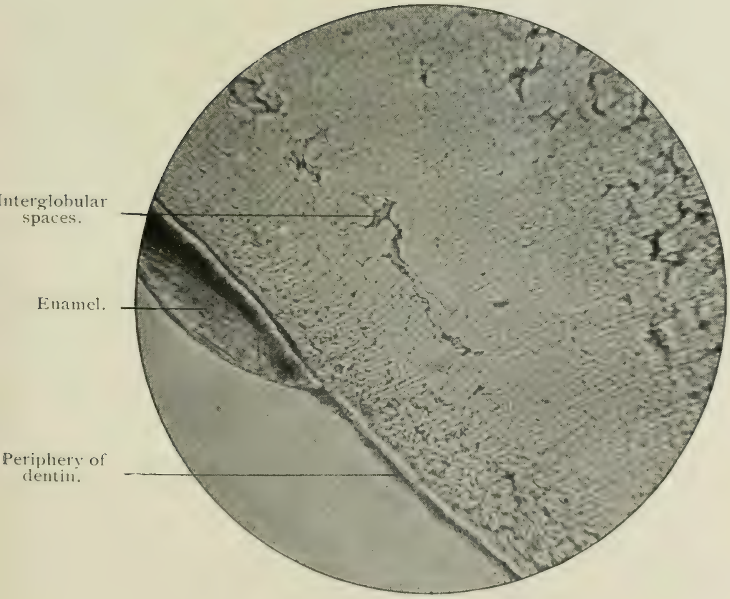
FIG. 3.



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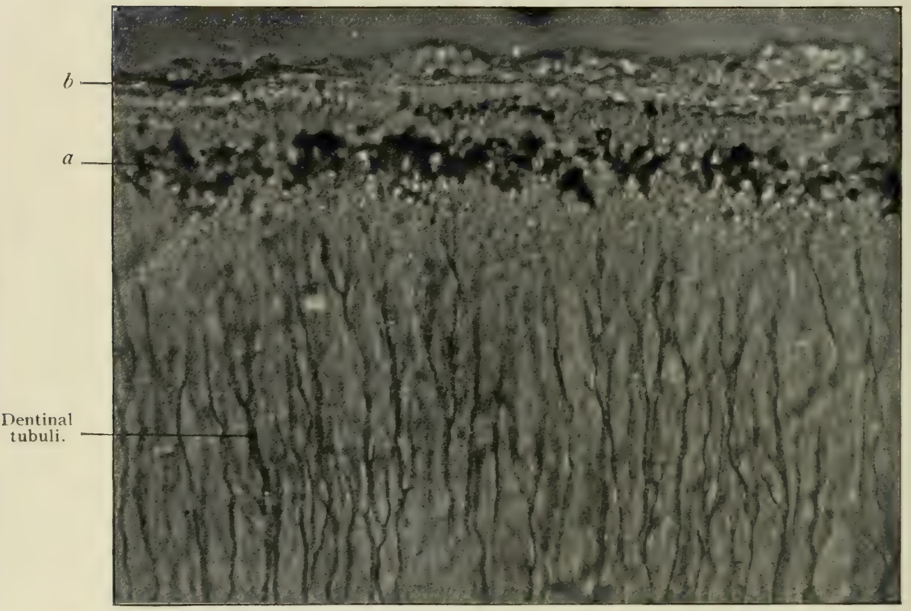
led to the belief that there are during the process of cementification periods of activity and periods of rest, or little activity. An examination of the tissue under low power, in which case the incremental lines appear with much regularity, adds much strength to this somewhat doubtful hypothesis.

Fig. 3 is prepared from a developing deciduous molar about three months after birth. At this early period the developing organ is made up of enamel and dentin only, the process of cementification not having progressed sufficiently to be observable. The establishment of the dentinal periphery, which surface is unchangeable except in density, provides a basis for the first formed layer of cementum, generated by the cementoblasts, which are now forming in the inner layer of the tooth-follicle. In close proximity to the surface the interglobular spaces are observed somewhat widely distributed and proportionately large in size, this latter feature being characteristic of young dentin, resulting in a surface poorly calcified, and thus affording a ready attachment for the cemental tissue.

FIG. 4.



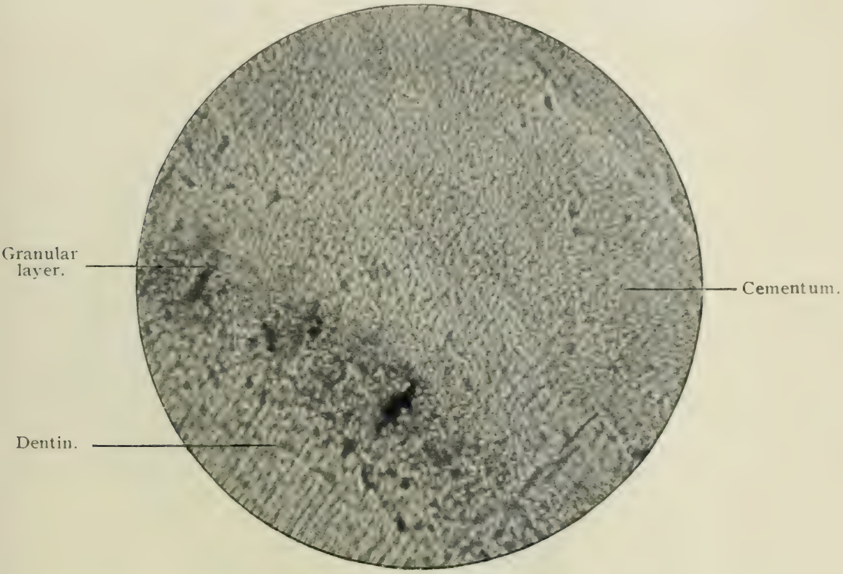
Techn. ⅛-in. obj. × 500.

Fig. 4 shows the process of cementification under way, the section being prepared from a six-months-old tooth. Under this high power the partly calcified granular layer is shown at *a*, beyond which point at *b* the cemental tissue is observed.

If we examine the ground-substance of this developing tissue, we find as illustrated in Fig. 5 an unbroken granular appearance, possessing neither striations, fibers, nor cement-corpuscles. This appearance is one which persists in the innermost, oldest, or first formed strata, and is again noticeable in the outermost or youngest stratum.

While the older stratum retains its primary character, this cannot be said of those strata subsequently laid upon it, for these successively develop in their matrix the partially calcified cells and fibers from the formative tissue. We must therefore conclude that these residual elements become encapsuled within the matrix as development proceeds, but are not observable until a later period.

FIG. 5.



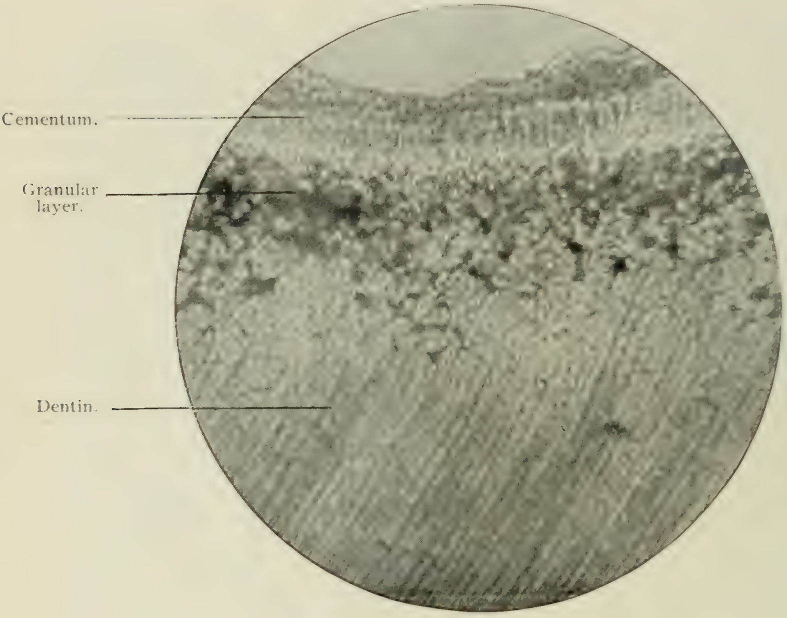
Techn. $\frac{1}{12}$-in. o. i. obj. × 1000.

In Fig. 6, taken from a one-year-old tooth, a further advance in the process of calcification is shown. Many of the transverse fibers of the peridental membrane are observed penetrating the developing tissue, and at a later period will by their partial calcification become a part of its substance. There has already been established an intimate blending of the cemental tissue with the dentinal tissue through the medium of the granular layer, and by the further calcification of the latter this union gradually becomes more thorough.

The next slide, Fig. 7, illustrates three distinct zones of developing cementum, the older, unbroken, granular zone *a* now beautifully cemented to the granular layer, a second or intermediate zone *b* having encapsuled within its ground-substance many of its formative cells, and an outer zone *c* but recently laid down, showing numerous longitudinal wave-like striations, emblematic of the cementoblastic activity. In this outer zone the minute laminations disappear as the tissue becomes more thoroughly calcified, and the matrix gradually partakes of the nature of the older tissue.

The three zones here represented, and which are again reproduced in Fig. 8, prepared from another tooth of about the same age to show the similarity in the process of development, are usually considered as forming three strata in the matured tissue; but by an examination with a much higher power, Fig. 9, these primary strata are themselves found to be traversed by regularly disposed, longitudinal lamellæ presenting numerous varicosities. Outside of the interest attached to the process of development in young cementum, there is little field for study, but as the tissue increases in thickness we are presented with a structure much more complex in character, and admitting of much additional research. The position which the cementum occupies upon the root also has much to do with its character. I have referred to the process of cementification as a continuous one, and this it should undoubtedly be considered, and especially will the growth of the tissue be continuous as long as the tooth keeps up its functional activity. This increase in bulk will generally be much influenced by the proportionate width of the alveolo-dental space, and as a result the tissue in the region of the cervix will undergo but slight change.

FIG. 6.



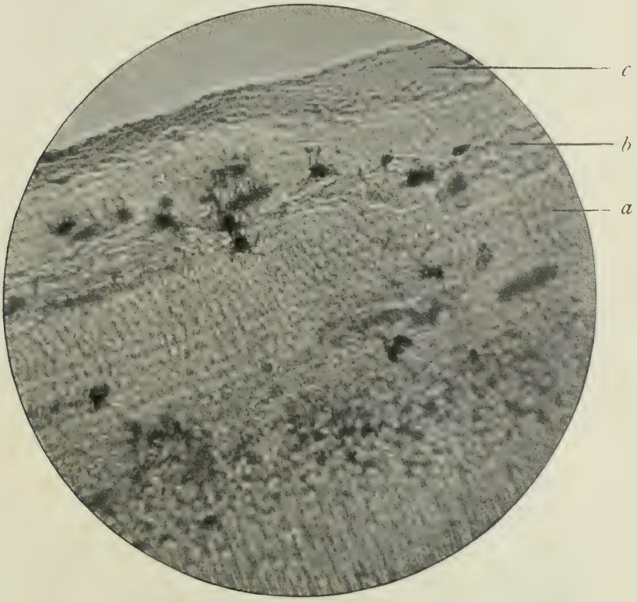
Techn. ⅛-in. obj. × 60.

Fig. 10, prepared from the cervix of an adult tooth, shows the general character of the structure under low power. In this region there is little to be observed under this magnification except a slightly broken granular matrix. Lacunæ are few in number, and when present possess extremely short and irregular canaliculi.

In Fig. 11, much greater amplification, the same tissue is observed to be made up of irregular laminations, arranged apparently without regard to one another, and placed at irregular intervals about the field are the remains of the formative cells.

Fig. 12 represents normal striated cementum from the root of the same tooth, but in the region of the apex. With this power the complex nature of the thicker tissue may be observed, longitudinal striæ, transverse fibers, cement-corpuscles, and zones of apparently unbroken granular matrix all serving to this end. In this region the ground-substance when examined with a higher power partakes very much of the nature of that found in the cervical region, but the transverse markings are hardly sufficiently pronounced to be classed as varicosities.

FIG. 7.



Tech. ⅛-in. obj. × 100.

To continue our investigations let us examine in detail the lamellæ, the cement-corpuscles, and the cement-fibers of the normal tissue. We are told that the lamellæ are about the same in number over all parts of the tooth-root, but that they are much thinner at the neck than at the apex; in addition to this they are usually considered as running parallel to the surface of the dentin. While these statements may, and probably do, coincide with the conditions present in young cementum, they do not hold good after the adult period. The lamellæ in the region of the apex are

FIG. 8.

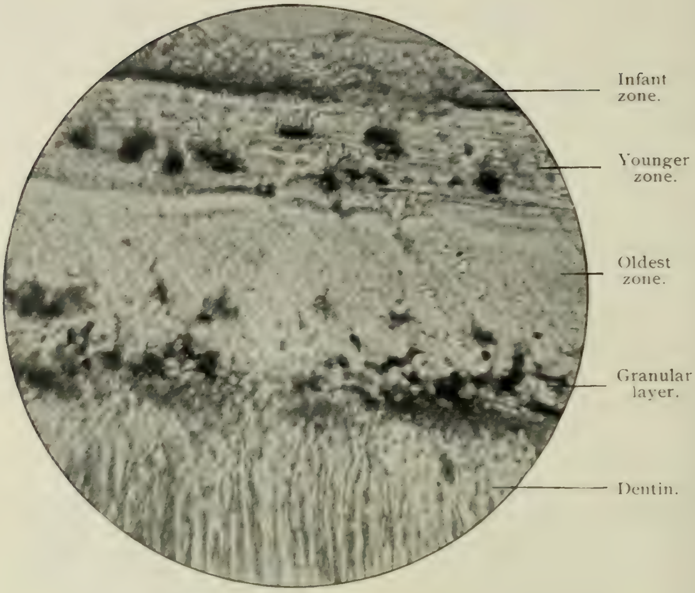


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FIG. 9.

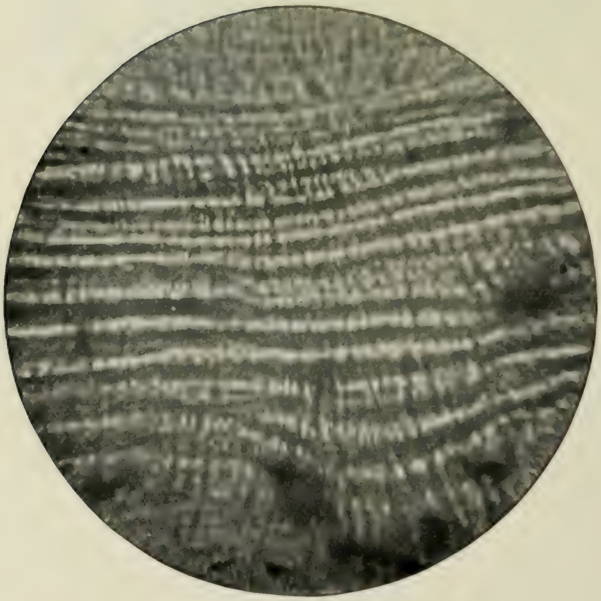

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FIG. 10.

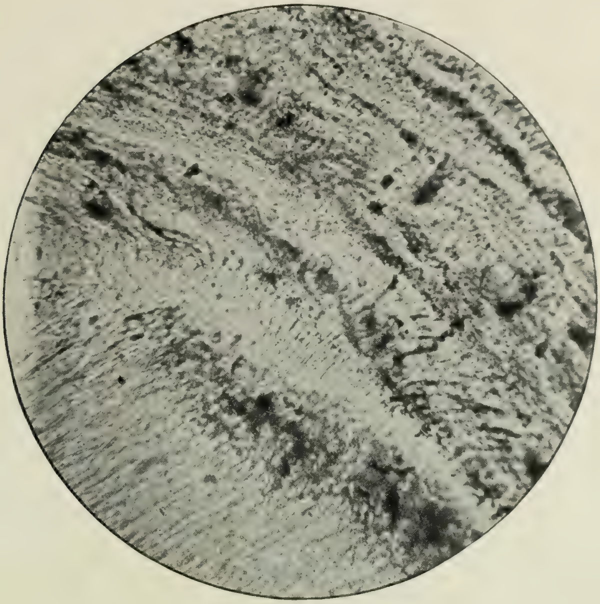

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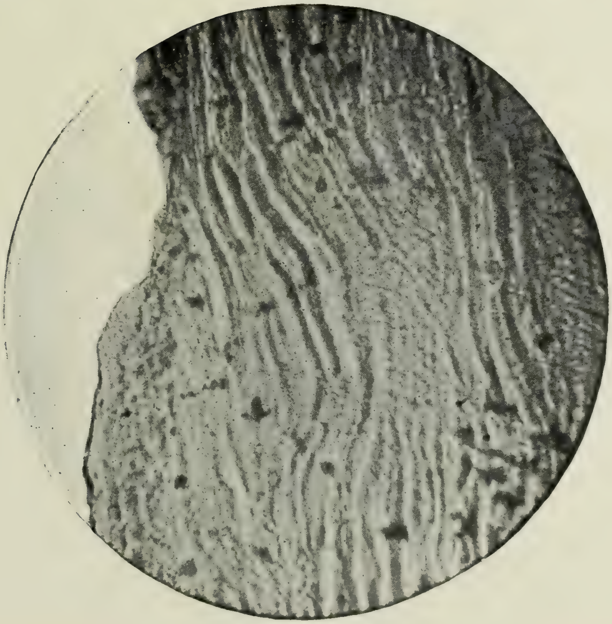
FIG. 11.

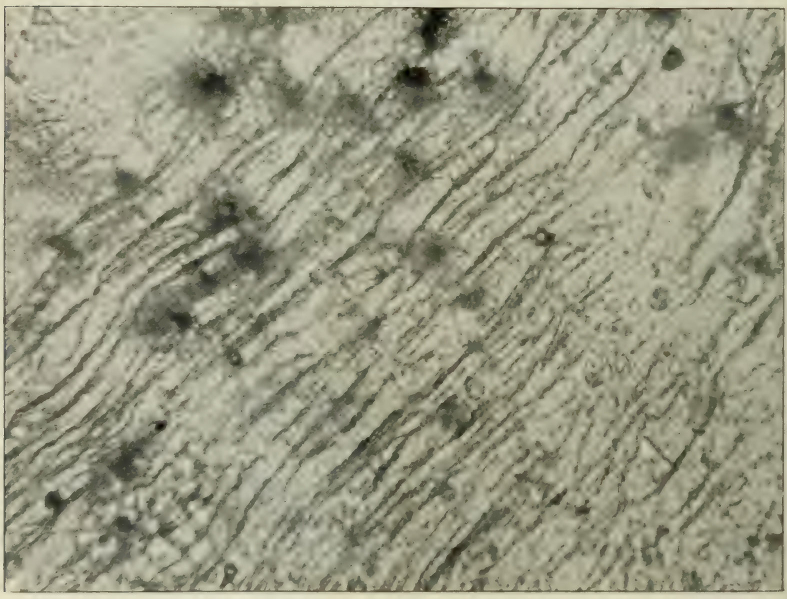


Techn. $\frac{1}{12}$ in. o. i. obj. × 300.

not only of greater width, but are usually more numerous than those occupying the cervical region of the same tooth.

Fig. 13. In this illustration the manner in which the lamellæ increase in number is represented by the older lamellæ of the cervical region *a* merging into the younger strata of the apical region *b*. One cause which might be assigned for the overlapping of the extremities of the older lamellæ by those more recently formed may be given as follows: as the growth of the root proceeds in the direction of its long axis, cementification takes place upon the surface of the dentin, and before the apical portion of the root is calcified, two or more strata of cementum have been deposited upon that part of the root first calcified, while the extremities of the cemental layers gradually degenerate and the younger lamellæ are deposited over them. This mode of generation would of course result in a greater number of lamellæ about the cervix, providing the cemental deposit was equal in all parts; but this is not the case, the cementoblasts about the apex being imbued with a greater and more constant activity.

Fig. 12.



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The incremental lines, or lines of growth, which over a given area appear under low power to be more or less regularly placed one beyond the other, and fully calcified, are shown in Fig. 14 to be but partially calcified, which fact adds much to the theory that the process of cementification is an intermittent one.

On the other hand, if the presence of the lamellæ is to be ac-

FIG. 13.

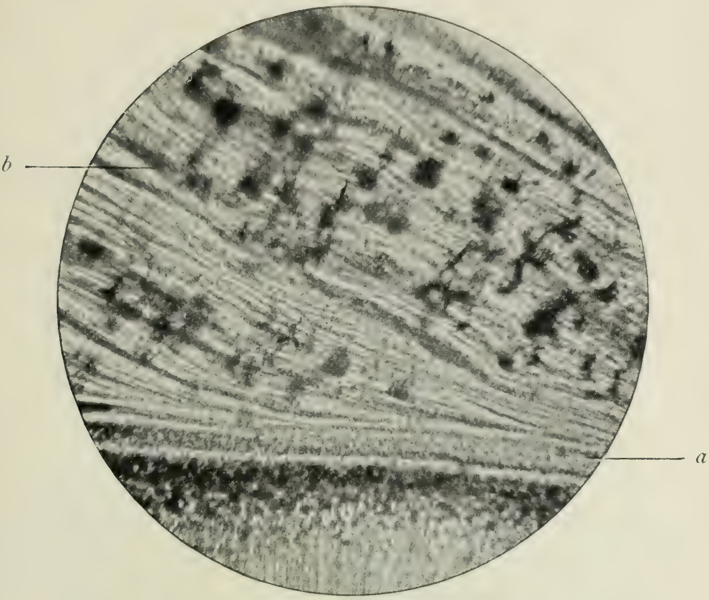

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FIG. 14.

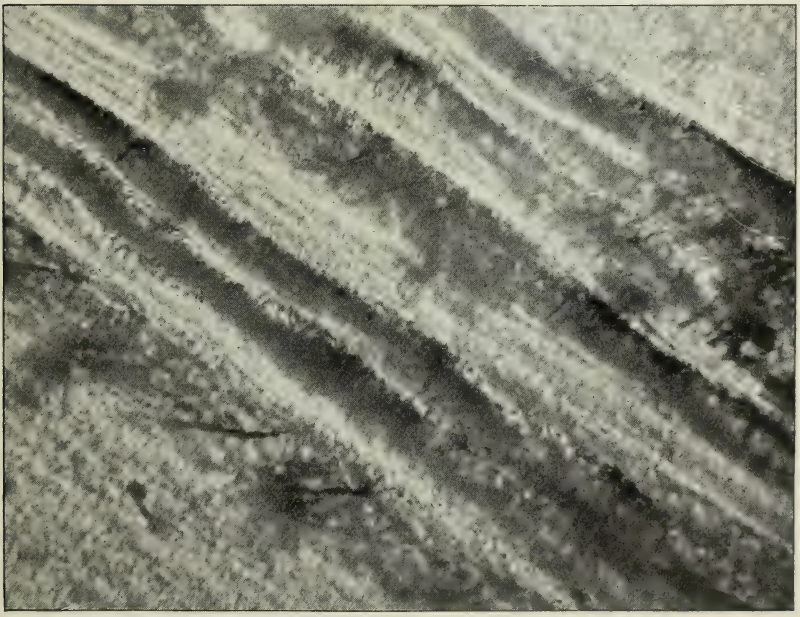

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FIG. 15.

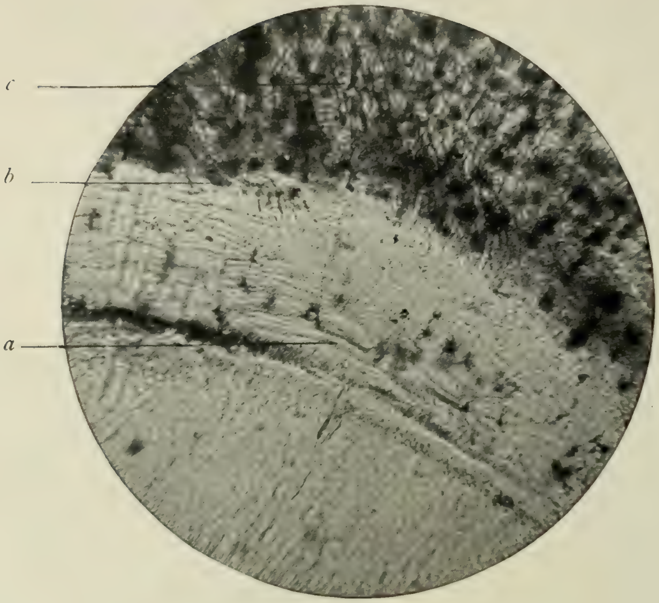

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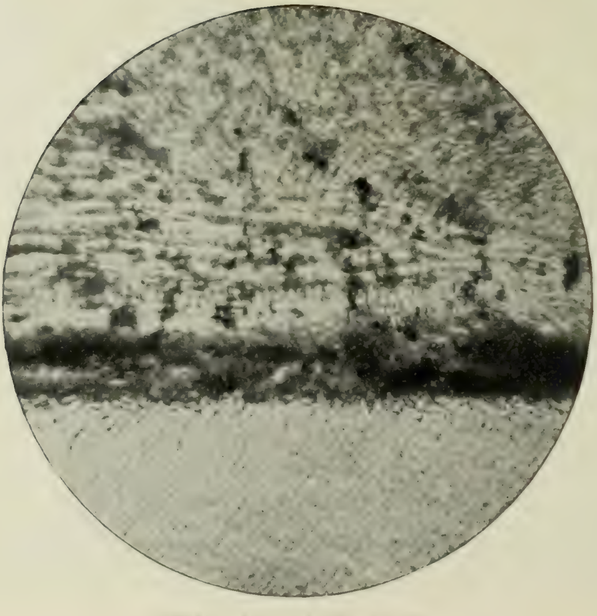
FIG. 16.



Techn. $\frac{1}{12}$-in. o. i. obj. × 300.

cepted as an evidence of interrupted activity of the cementoblasts, the incremental lines in transverse section, Fig. 15, would undoubtedly be continuous and unbroken,—not necessarily unbroken, but they would not end abruptly as at *a* and be followed by a zone of simple granular ground-substance; such an appearance might be produced in longitudinal section, when the specimen was not ground absolutely parallel to the laminations. In this illustration prepared from the root of a forty-year-old molar, the entire width of normal cementum is represented between *a* and *b*, beyond which point, at *c*, the structure is hypertrophic in character.

FIG. 17.

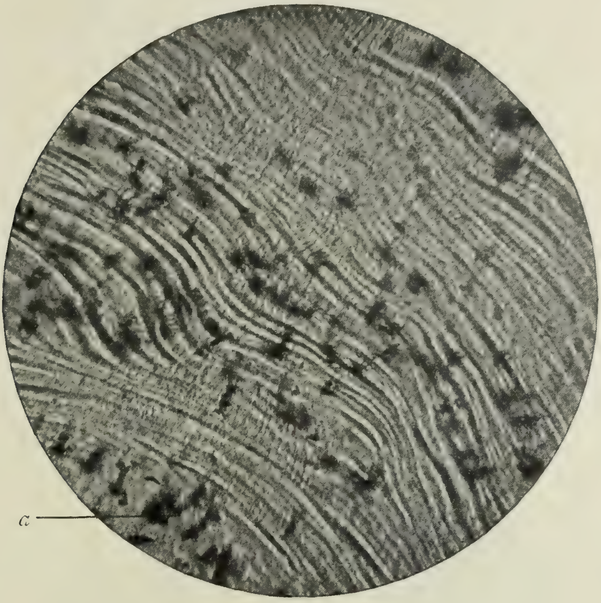


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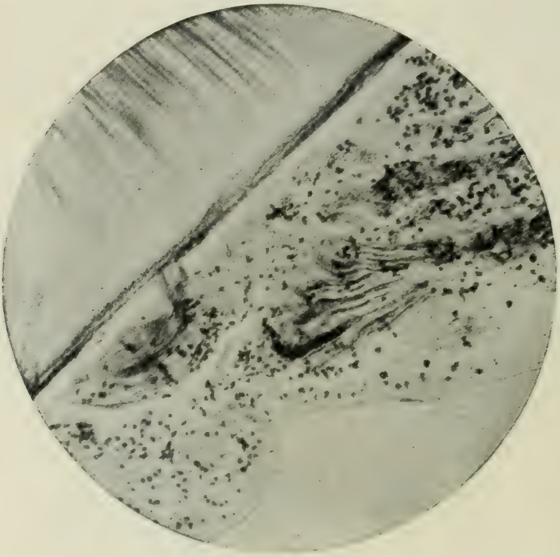
Fig. 16 is from the same specimen, and illustrates under greater magnification the rather abrupt endings of the irregularly disposed lamellæ.

The next illustration, Fig. 17, is prepared from a transverse section of an adult bicuspid in the region of the apex, and is here introduced with the intention of showing how the disposition of the lamellæ may vary in thin normal cementum. About *a*, which represents the granular union of the cementum with the dentin, the incremental lines are observed to follow the surface of the dentin or transversely to its fibers. As the center of the area is approached, this regularity is much interfered with, some of the lamellæ being discontinued, others greatly thickened, while the field taken in its entirety suggests anything but regularity in the laying down of the different strata.

Fig. 18 is illustrative of the characteristic arrangement of the lamellæ in nodular excementosis. In this abnormal tissue the striations appear to be placed without regard to the surface of the dentin or the external form of the structure.

While the laminated markings are usually characteristic of circumferential cemental tissue in general, they are seldom found in interdentinal cementum, or that growth which takes place between roots resulting in their fusion. This refers to the tissue as found between closely associated roots of an individual tooth, as shown at *a* in Fig. 19, and not to that union which sometimes occurs between the roots of different teeth.

Fig. 18.



Techn. ¼-in. obj. × 30.

In such locations as that shown in the previous illustration, the older lamellæ dip down part way between the roots, but again return to the periphery without entering the interdentinal space.

In Fig. 20, which furnishes a general view of this interdentinal cemental tissue, the general character of the ground-substance is depicted, while occupying the central portion of the tissue is a colony of cement-corpuscles longitudinally disposed, and which, as will be illustrated later on, are possessed of a form peculiar to this locality. Attention is also directed to the characteristic appearance of the granular layer at *b*, these fantastically arranged markings being made up of numerous minute interglobular spaces. In most instances, and especially before middle life, the central part of interdentinal cementum is occupied by a longitudinal vein, undoubtedly the uncalcified remains of the formative tissue.

In Fig. 21 such a vein is shown, together with the advance in the

FIG. 19.

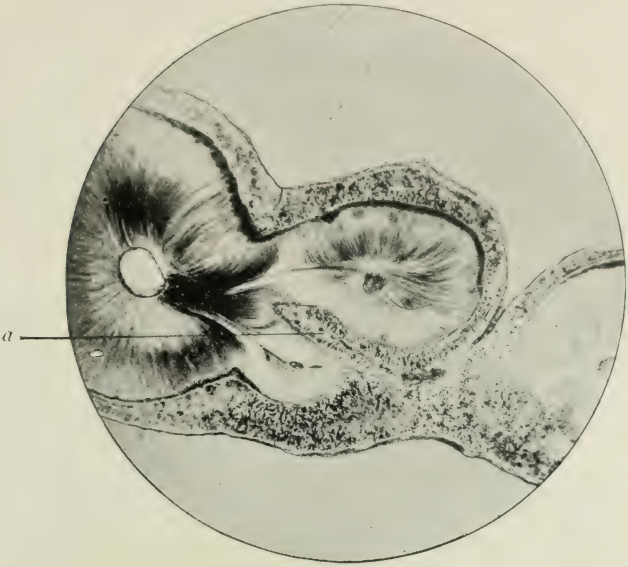


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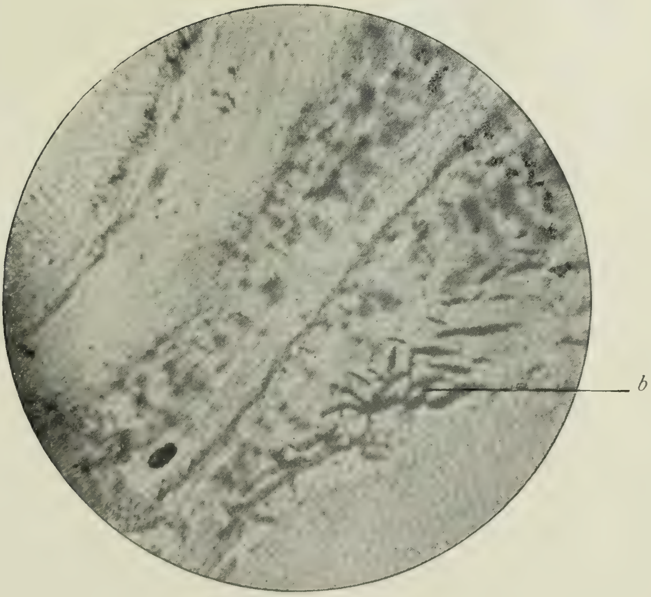
FIG. 20.

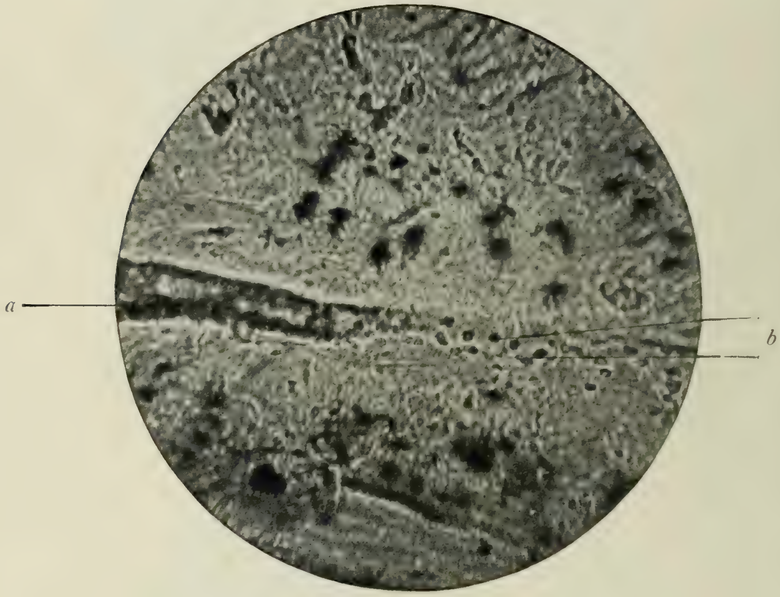


Techn. $\frac{1}{12}$-in. o. i. obj. × 300.

calcific action, as it proceeds from the surface toward the interior. *a* is the uncalcified tissue giving support to the cementoblasts, while at *b* the process is complete and the cementoblastic cells are seen crowded between the calcifying borders.

*Cement-Corpuscles.* Many of the cementoblasts of the peridental membrane, like the osteoblasts of the periosteum, become encapsuled within the developing tissue, and persist as irregularly shaped spaces filled with a protoplasmic mass, and are known as cement-corpuscles. These correspond to the lacunæ of bone, but unlike those are very variable in size, in form, and in the number and direction of their processes. Fig. 22 shows a number of cemental lacunæ and canaliculi. In the majority of instances the body of the corpuscle will be found to be oval or slightly oblong, with its long axis parallel to the surface, but it is by no means uncommon to find them very irregular in outline, with the greatest diameter in the opposite direction. The processes are quite variable in length and irregular in their course, and while there is a general disposition for them to extend toward the surface, they in many instances radiate in various directions. All of these features are in contradistinction to the lacunæ and canaliculi of bone, which are placed with much more regularity in the osseous matrix, the corpuscles being oblong or cylindrical in outline, with their processes about equally distributed in every direction, uniting directly and positively with the canaliculi of neighboring lacunæ. As

FIG. 21.



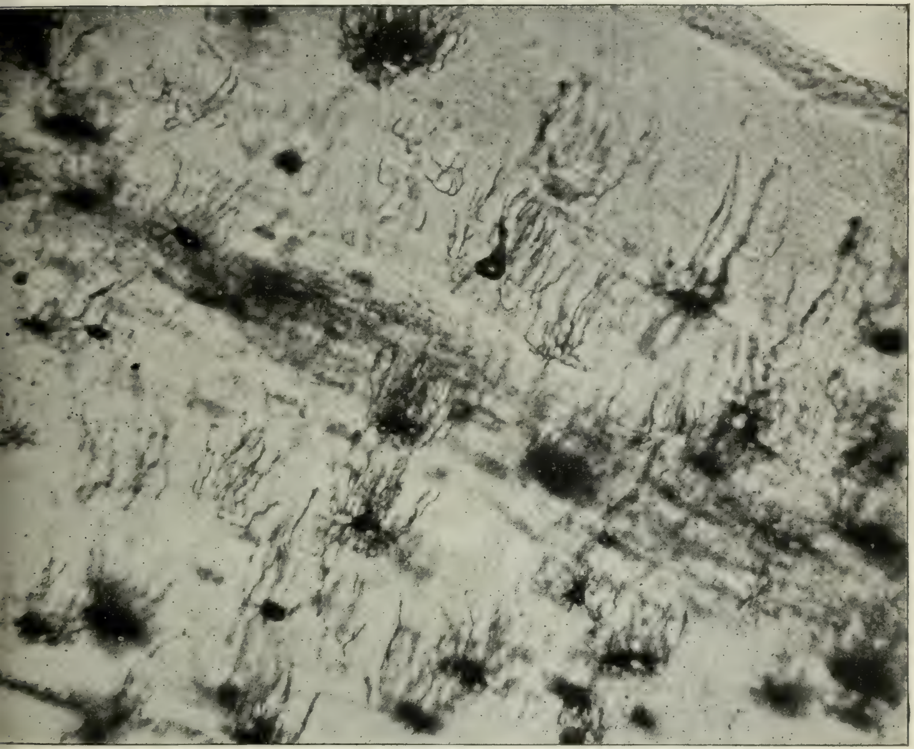
Techn. $\frac{1}{12}$-in. o. i. obj. × 300.

above stated the cement-corpuscles are very variable in outline, and this diversity appears to be much influenced by their location upon the root.

The younger cement-corpuscles, or those associated with the outer strata of the tissue, are usually distinctly outlined and provided with delicate processes, the majority of which are directed toward the surface.

In the older strata, Fig. 23, the outlines of the corpuscles are much more irregular and the processes short and extremely clumsy. In older cementum, especially in the region of the apex, the cement-corpuscles and the cement-fibers are so intimately associated, Fig. 24, that it is with difficulty that the canaliculi may be distinguished from the fibers. In this illustration, produced from a thin section, we have shown characteristic cemental tissue of the deeper lamellæ of old age, and as such an arrangement of the corpuscles and fibers is never observed in the young tissue, we must infer a structural rearrangement as age advances.

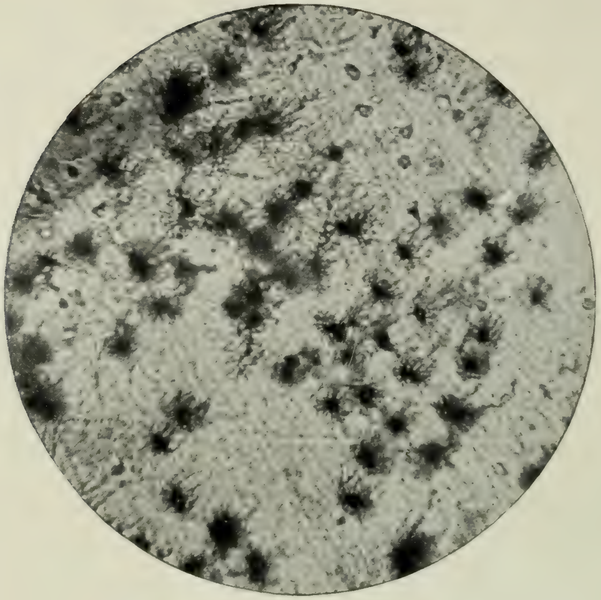
FIG. 22.



Techn. $\frac{1}{12}$-in. o. i. obj. × 1000.

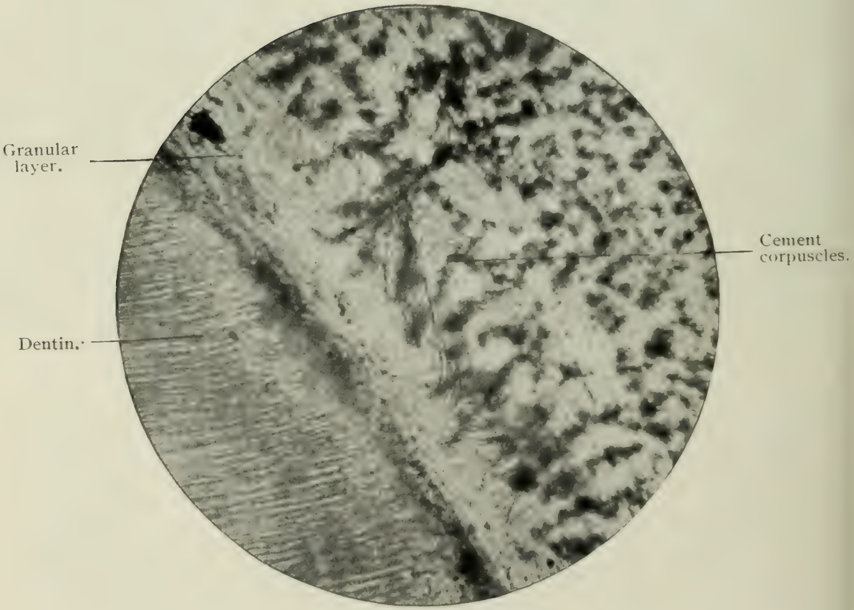
Fig. 25. The proportionate distribution of the corpuscles to the

FIG. 23.



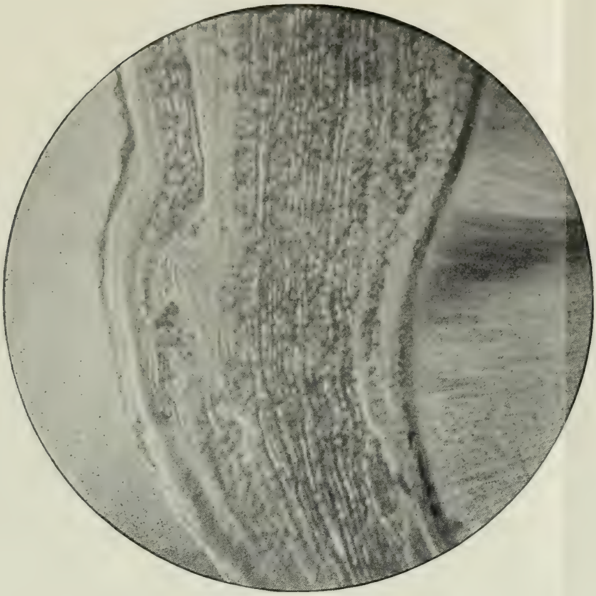
Techn. ⅛-in. obj. × 80.

FIG. 24.



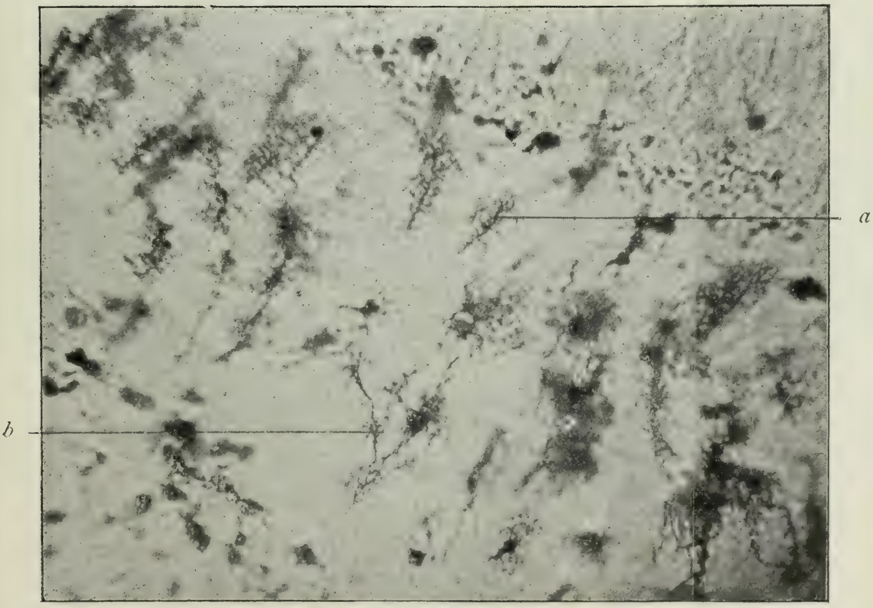
Techn. ⅛-in. obj. × 80.

FIG. 25.



Techn. 1-in. obj. × 30.

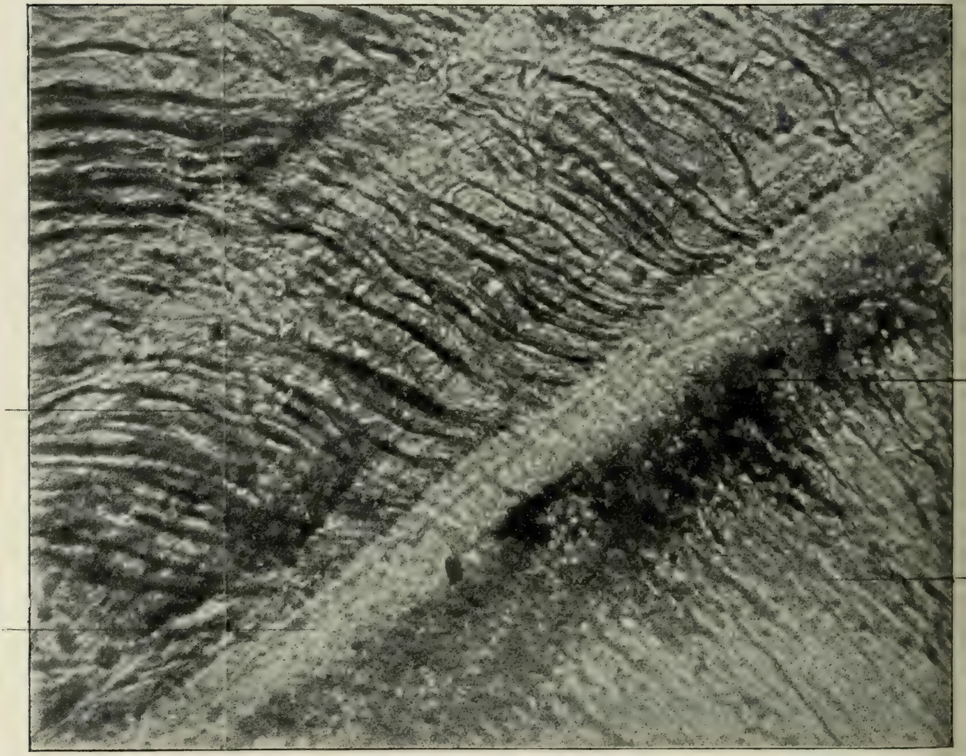
FIG. 26.



Techn. $\frac{1}{12}$-in. o. i. obj. × 500.

various parts of the tooth-root is well shown in this illustration, prepared from a thirty-year-old cuspid tooth, the innermost or older zone and the outermost or younger zone containing but few. In the intervening strata they are most abundant, especially in the region of the apex, gradually becoming less numerous in passing crownward. In interdental cementum the cement-corpuscles are somewhat regularly distributed throughout the ground-substance adjacent to the granular layer, but near the center of this confused mass of imperfectly calcified tissue they are seldom present.

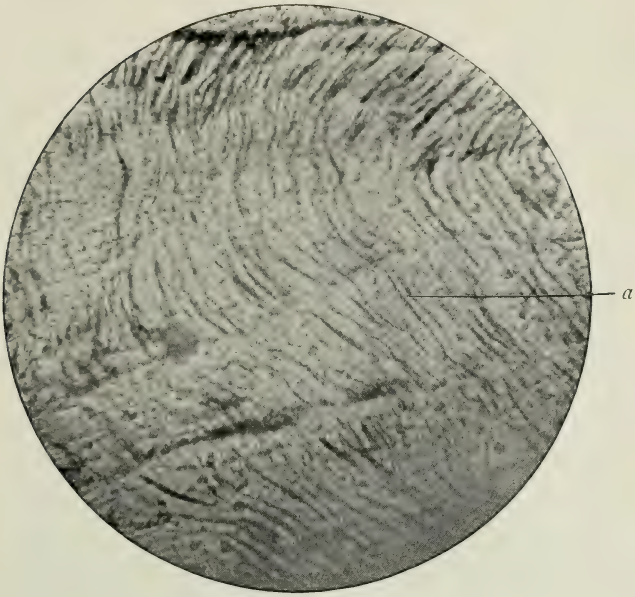
Fig. 27.



Techn. $\frac{1}{12}$-in. o. i. obj. × 1000.

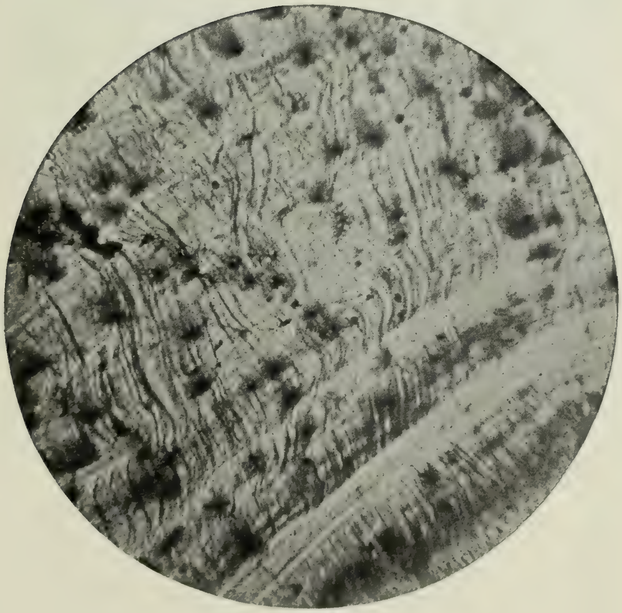
Fig. 26. When the interdentinal space is slight, peculiarly formed corpuscles are observed, as here illustrated. They are provided with a long rod-like central body or trunk, from which are given off numerous tree-like branches, *a*, the terminals of which are frequently lost in the granular layer upon either side. There is a decided disposition upon the part of these bodies, which are characteristic of interdentinal cementum, to unite through their delicate processes, as shown at *b*, and by so doing form an inter-

FIG. 28.



Techn. ⅙-in. obj. × 60.

FIG. 29.

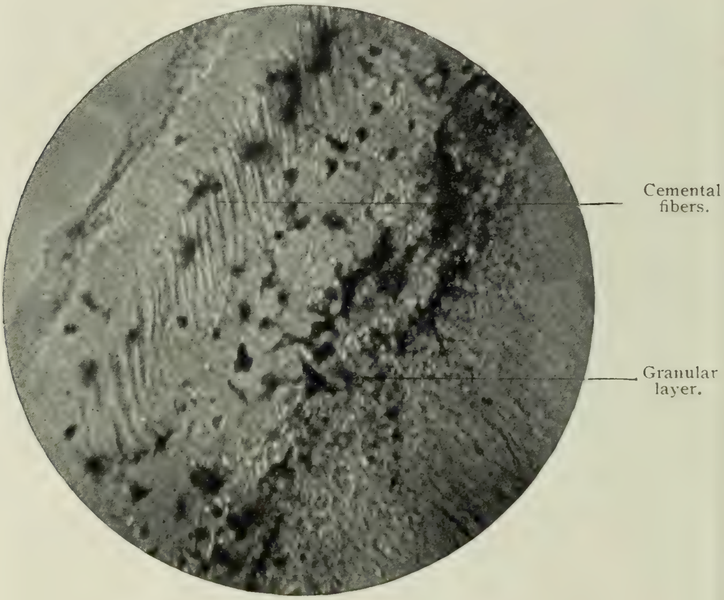


Techn. ⅛-in. obj. × 60.

communication much more complete than that established by the canaliculi of subperidental cementum.

*Cement-Fibers.* In a manner similar to that in which the cementoblasts become encapsuled within the developing cemental tissue forming the cement-corpuscles, many of the fibers of the peridental membrane undergo a like transformation, and are found in the tissue as more or less imperfectly calcified fibers transversely disposed. By many writers these filamentary thread-like structures have been compared to the delicate rod-like processes which pass through the concentric lamellæ of bone serving to hold them together, and designated as Sharpey's fibers, but according to Black and others these are the principal fibers of the alveolo-dental periosteum, and as above stated become a part of the cemental tissue during its evolution. In Fig. 27 these fibers are shown under high power. *a* represents the primary or older stratum of the cementum, and it is from the outer margin of this zone that the fibers first make their appearance, passing more or less directly in the direction of the surface until the next incremental line is reached, at which point they gradually disappear, but recur in the succeeding lamellæ.

FIG. 30.

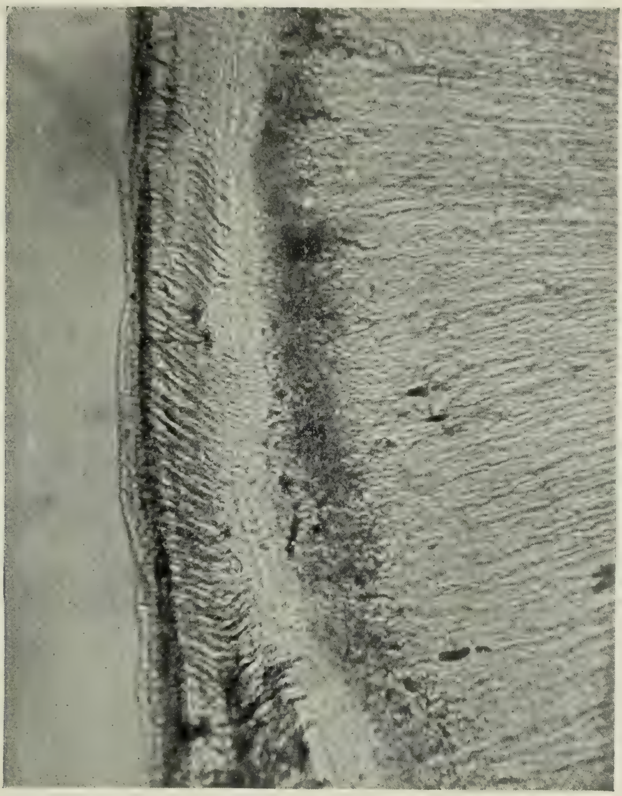


Techn. $\frac{1}{12}$-in. o. i. obj. × 200.

Fig. 28. There is a marked disposition for the fibers of each concentric lamella to keep within its borders, this condition being well demonstrated in this slide, reproduced from a transverse section of an adult tooth. In this section the majority of the fibers are observed to extend from one incremental line to the other, but it is

not uncommon to find them extending unbroken through two or three lamellæ, as at *a*, and not infrequently they may extend without interruption through the entire thickness of the tissue. This break in the fibers undoubtedly takes place during the period of cementoblastic inactivity if we must recognize such an occurrence, complete calcification of the white fibrous tissue taking place during this interval. This theory receives additional support when it is taken into consideration that the encapsuled fibers are nearly always of the greatest diameter at the oldest extremity, or that nearest the dentin.

FIG. 31.



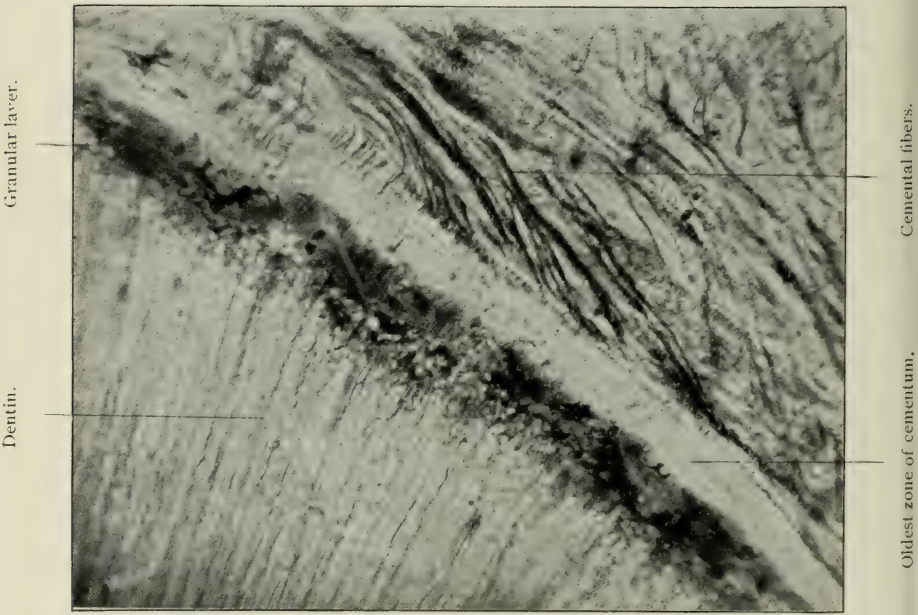
Techn. $\frac{1}{12}$-in. o. i. obj. × 100.

Fig. 29. In certain localities, notably in the older lamellæ in the region of the apex, the fibers are plentifully distributed to a region comprising three or four strata, followed by a zone of similar proportions in which they are absent.

The cemental fibers considered as the partially calcified residue of the principal fibers of the peridental membrane, would naturally assume a general direction relative to their manner of distribution before this metamorphosis, and in most instances they are thus disposed. In Fig. 30, taken from the center of the long axes of a growing bicuspid, the disposition of the fibers, which are alone observed in the second lamella, is slightly crownward. The inclination for the fibers of the cementum to be thus disposed is most pronounced in young cementum, but after middle life or at a period when the tissue has taken on additional thickness, the course of the fibers even in the same tooth is greatly at variance.

In Fig. 31, also from a young tooth, the cemental fibers are shown springing directly from the peridental membrane, with their free extremities penetrating this tissue. This specimen is prepared from a transverse section in the cervical region, and the inclination of the fibers is such as to warrant the belief that they were some of those whose function it has been to return the tooth to its normal position when slightly rotated upon itself.

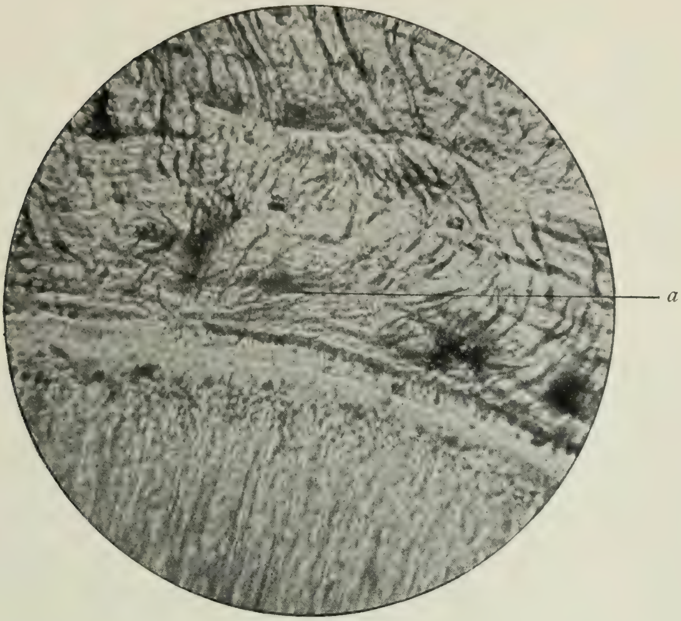
Fig. 32.



Techn. $\frac{1}{12}$-in. o. i. obj. × 300.

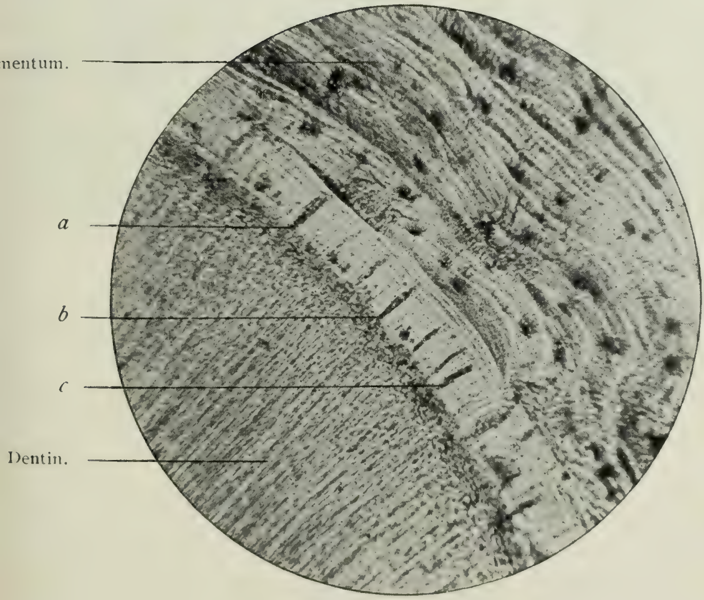
In Fig. 32 the fibers are shown passing almost parallel to the surface and in the direction of the apex, in this instance appearing in bundles rather than as individual fibers. The attachment of the fibers to the surface of the primary lamella by a sudden dipping of their extremities is also well shown. We have thus observed fibers passing crownward, and in the direction of the apex, but they are seldom found passing directly outward in the substance of the tissue in young teeth.

FIG. 33.



Techn. ⅛-in. obj. × 60.

FIG. 34.

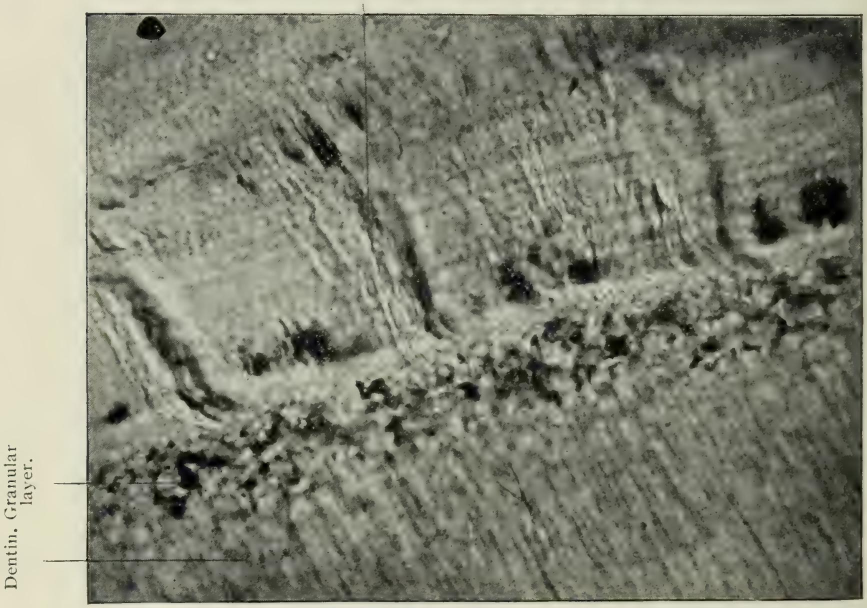


Techn. ⅙-in. obj. × 80.

Fig. 33. In thick normal cementum, the distribution of the fibers is apparently without regard to the part of the root which they occupy. In this illustration the fibers are shown running in various directions, the fibers of the older tissue at *a* being more or less broken up by further calcification, while those near the surface partake more of the nature of those previously examined in the tissue earlier formed.

Fig. 34. Another class of fibers common to the cemental tissue, and which the writer fails to find described in any of the works to which he has referred, are those which appear to be grouped in bundles, springing at regular intervals from the granular layer, and penetrating the basement layer of the cementum as though serving to tie this tissue to the periphery of the dentin. In Fig. 34 a number of these bundles are shown at *a*, *b*, and *c*. While the field is but a small proportion of the circumference of the root, they are observed under low power to be distributed in like manner to all parts. These circumferential fibers, as they may be termed, are also observed in longitudinal section, being distributed with considerable regularity throughout the whole extent of the root. They are also present in cementum at the earliest period at which it may be studied, the individual bundles at this time being proportionately larger. These might be, and probably are, considered as prolongations from the dentinal fibers, but the writer is doubtful if the true

FIG. 35.



Techn. $\frac{1}{12}$-in. o. i. obj. × 500.

fibers from the dentin tubes are ever found penetrating the cementum. In order to demonstrate that these fibers do not emerge from the dentin, an examination was made with a $\frac{1}{12}$-in. o. i. obj., and the result is plainly manifest in Fig. 35 at *a*. When the margin of the granular layer is reached, the fibers are observed to curve almost at right angles to the dentin tubes and become lost in the outer zone of this layer.

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# A Few Considerations in Filling Teeth.

BY C. N. JOHNSON, L.D.S., D.D.S., CHICAGO, ILL.

The problem of preventing or controlling caries of the teeth is one which enters very materially into the health, longevity, and happiness of the human race. Apparently we are not yet able to prevent decay, and it thus becomes imperative that we study the best means of checking and controlling it. When caries occurs on any surface of a tooth the dentist should study carefully the conditions which brought it about, and should aim in his operation so to change those conditions that caries will not be likely to recur.

Too many practitioners are in the habit of following their work day after day in a thoughtless, slip-shod manner, without due consideration of the principles which should underlie all operative procedures, and without a proper study of the relations of cause and effect. When failures occur, as they do in the hands of all practitioners—some more, some less—the most profitable lesson is not always learned thereby. No dentist should allow himself to pass over any failure, whether his own or another's, without carefully studying the particular reasons for that failure, and the problems which must be solved to avoid a repetition in the future. With the clearness of vision which this kind of study must eventually bring about the practitioner will be better equipped to serve his patrons, and his failures will grow perceptibly fewer. If all dentists would bring to their work a due regard for this form of observation, it would add materially to the permanence of dental service.

In the consideration of the present subject the principal aim will be to direct attention to some of the causes of failure in filling teeth, and to offer a few suggestions relative to possible improvement in methods of procedure. In doing this no originality of treatment is claimed. The thought of the profession in recent years has been too active along these lines for any one individual to claim much in the way of originality. But some of the recent advances in practice would seem to need systematizing, and most of them require emphasizing. This is the present aim.

The plan is to treat the various topics as nearly as practicable in the order of their performance in the mouth, to give in detail the consecutive steps of the operation, and to say something of the technique of the subject. This latter is considered to be of very great importance, but it is a matter quite difficult of intelligent treatment. The proper selection and use of instruments has much to do with the effectiveness of our work and the comfort of our patients, but the personal equation of each individual operator enters so prominently into the question that it is difficult to lay down rules for all to follow. Then again there is such a variation in patients with regard to their toleration of different instruments that it is not always judicious to use the same instruments in the same way on all patients. We must study carefully this susceptibility of our patients, and in all cases where it will not interfere with the perfection of our work we should respect their preference. Some individuals will submit to the use of hand instruments, such as excavators and chisels, with better grace than they will to the engine, while very many prefer the smooth, light touch of a rapidly-revolving bur to the grating, rasping sensation of an excavator. In the routine practice of operating there are some stages of the work where the engine is clearly indicated, and some where hand instruments must be used, but the predominance of the use of either may in certain instances be determined by the patient. Not that we should in any sense allow patients to dictate to us how we shall operate, but that we may often profitably study their varying susceptibilities to the impressions made upon them by different instruments and govern our manipulation somewhat thereby.

Much in the way of prejudice may be overcome by the invariable use of keen, sharp instruments and a dextrous, careful method of manipulation. This applies as well to the engine as to hand instruments. The dentist should cultivate the utmost delicacy of touch, so as to impress upon his patient at all times the fact that he is giving the least possible discomfort commensurate with effective work.

The system of technique here suggested is not presented as being applicable to all operators or all patients. It is not even claimed that it is the best system, but merely that it is an attempt to formulate a definite and consecutive method of procedure in the performance of many of our operations, which in the past seem for the most part to have been performed without method and without system.

## Preparation of Cavities.

### Approximal Cavities in Incisors and Cuspids.

*Simple cavities not involving the incisal angle.*—When decay occurs on the approximal surfaces of any of the anterior teeth, we are confronted with problems peculiar to the locality. The first consideration, as in every other class of cavities, is of course the preservation of the teeth, but in these exposed positions we must not entirely ignore esthetic and artistic effects if we would do the highest class of service. Were it possible for us to save these teeth by filling without advertising the fact to the world, it would be our manifest duty to do so; but unfortunately this cannot always be done. It may also be stated that in the attempt to hide our work by confining our fillings to narrow areas we often jeopardize the teeth and lessen the confidence of the public in the permanence of dental operations through recurrence of decay and consequent undermining of the tooth-structure.

Observant operators have noticed that there are certain points around ordinary approximal fillings where decay is most likely to recur. This relates in anterior teeth to the cervico-labial, cervico-lingual, and the incisal angles. The reason for this is found in the fact that these regions are not kept clean by the friction of food in mastication, or by the lips or tongue in their various movements. If the anatomical relation of the approximal surfaces of these teeth is studied, it will be seen that a considerable area in the vicinity of the contact point is not self-cleansing. This is what admits of caries in this region in the first instance. If in the preparation of a cavity we limit the area to a small round outline, we have left unprotected, at the points indicated, more or less of the surface of enamel. With the same conditions present and the same influences at work which originally induced decay, there is little to prevent a recurrence. The remedy lies in so extending the outlines of the cavity that the margins are carried to a point where they will be kept clean. This process has been termed "extension for prevention" by Dr. G. V. Black, and its observance must be insisted upon where the most permanent work is required.

Another point of frequent failure around these fillings is along the lingual margin. This is due to the fact that the lingual wall is often left exceedingly thin, and the enamel is crushed under the stress of mastication. The force of the lower incisors comes directly against this surface, and any unprotected enamel is likely to be broken down. In every instance where possible the margin should be so extended as to leave the enamel well supported by dentin, and wherever this cannot be done the enamel should be freely beveled and the gold built over it in such a manner as to protect it. Enamel protected in this way with care and skill will remain intact in ordinary positions, and yet this does not alter the general rule that enamel is safest when supported by dentin.

Fig. 1 shows the approximal surface of an incisor with a small round filling, *a*, points of recurrence of decay, *b b b*, and the outline to which the cavity should be carried for greatest safety, *c*.

This question of extension is a matter calling for the most careful consideration. It is confidently believed to be a solution of the problem connected with a very frequent form of failure in this class of cases, and yet it must not be employed indiscriminately. There are many cases where it would be manifestly impossible and injudicious to cut the cavity to the extent indicated. Patients apply to us for these fillings occasionally in such a nervous condition that any extra cutting beyond the present necessities of the case must be avoided. We should never jeopardize the nervous system of our patient in order to carry out some heroic theory. Then, again, there are persons in whose mouths the tendency to caries is so slight that extension for prevention would appear to be an unnecessarily extreme measure. In some of these cases where there is limited decay, small fillings may prove serviceable for years. The age of the patient also has an important bearing on the question. Whenever we find the approximal surfaces breaking down rapidly under decay early in life, we may infer that the process of caries is to be active in that mouth, and we must employ the most strenuous means to control it. Extension for prevention is here indicated to its fullest legitimate extent. But in a patient well toward maturity with an occasional cavity developing, we may often safely stop short of the most extreme cutting. Then esthetic reasons play an important part in the anterior teeth. If we can hide our fillings from view we should do so, and many of our patients are willing to take the chances of a recurrence of decay rather than have large fillings made in the first instance. A distinct understanding should be had with patients upon these points, so that they may enter intelligently into the merits of the different methods. We should be sufficiently honest with them to proceed on the theory that wherever these small hidden fillings are inserted the work must be considered more or less temporary, and must be kept under constant surveillance by the dentist.

In brief, the operator's attitude toward the practice of extension should be to aim always at the most ideal and permanent form for his cavities, and in every instance where he deviates from this it must be only on account of some well-defined reason for doing so.

Fig. 1.

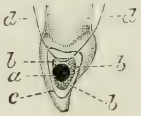


Fig. 2.

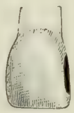
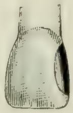


Fig. 3.



There is one feature connected with the appearance of fillings in the anterior teeth that must not be overlooked. As has been said, it is sometimes well to keep fillings unexposed to view if possible, but whenever it becomes necessary for a filling to show at all it should be extended labially, so as to show distinctly. The reason for this is that where gold is placed between teeth in such a way that it is in the shadow, the appearance a few feet distant from the patient is that of a black mass simulating decay, while if the filling is carried out sufficiently to allow the rays of light to reflect upon it the bright yellow tinge of gold is immediately perceptible. There should therefore be very little compromise between a filling kept entirely out of sight, and a good, bold showing of the gold from the labial aspect. Figures 2 and 3 illustrate this point.

*Separating teeth.*—The first requirement in operating on these cavities is to have sufficient space between the teeth for perfect access. This must be obtained in some instances by wedging previous to the operation, in others space may be gained while operating by the use of a separator. In cases where the teeth have fallen together to any appreciable extent as the result of deep approximal decay, or where the teeth overlap in a slight irregularity, the separator will ordinarily not gain sufficient space for a proper contour of the filling. Neither can we gain access to do perfect work on small, hidden cavities (in those cases where it may be deemed advisable to fill in that manner) short of extensive separation. Where the labial or lingual wall is well cut away, the access is simplified.

The methods employed for gradual separation previous to operating may be varied according to the requirements of the case. Rubber has been used for this purpose quite extensively in the past, but it is only in the rarest cases where rubber is properly indicated. The difficulty with this material lies in the fact that it cannot easily be maintained in position. The sloping surfaces of the teeth facilitate its tendency to slide away from the contact points and insinuate itself into the interproximal space to the serious injury of the gum tissue. Rubber should never be used even in the extremest cases without previously protecting the gum by packing cotton, gutta-percha, or cement against the cervical wall of the cavity, allowing it to extend across the interproximal space to prevent the movement of the rubber rootwise.

The materials best adapted for separating are cotton, gutta-percha, and waxed linen tape. Cotton should be packed firmly between the teeth while dry, and if there is difficulty in maintaining it in position it can be secured by passing a ligature between the teeth in the interproximal space before placing the cotton, and then bringing the ends down over it toward the incisal surfaces of the teeth and tying tightly around the cotton. This holds it securely in place and proves a very effective means of separating teeth. Fig. 4 illustrates the method of tying the cotton in place.

Gutta-percha may be employed by first adjusting the separator, forcing the teeth slightly apart, and packing the gutta-percha into the cavity and firmly between the teeth. The separator is then removed and the gutta-percha allowed to remain for several days. This will usually result in good space without soreness.

Waxed linen tape of a suitable width for the case in hand may profitably be employed in those cases where there has been little or no breaking down of the approximal surfaces, and where it would be difficult to retain cotton or gutta-percha. By either of these methods the pressure is so gradual that space is gained without the distressing irritation which usually accompanies the use of rubber.

In favorable instances, or in emergency cases, space may be gained at the time of the operation by the use of the separator. Wherever the separator is indicated it should be used in the following way: Care must be exercised in its adjustment not to allow it to impinge on the gum or unnecessarily wound the soft tissues. It should not be tightened to the limit at once, but merely "snugged up" till the patient feels it. Then, as the operation progresses, it can be gradually tightened at intervals without appreciable discomfort. By the time the cavity is prepared, sufficient space will usually have been gained to admit of the insertion and proper contouring of the filling, and then a slightly additional space obtained during this part of the operation will afford opportunity for polishing. When the filling is finished, the greatest caution should be observed in removing the separator. If it is loosened suddenly after being tightened to the extent usually necessary, it will result in most excruciating pain to the patient, the discomfort from this source ordinarily being greater than from the process of separating. It should be loosened very gently and slowly till the contact between the filling and the tooth next in line is sufficient to hold the teeth from further movement.

In manipulating the separator the greatest delicacy of touch should at all times be exercised. It is a dangerous and cruel appliance in the hands of the thoughtless or careless. The operator should invariably employ one hand to steady the bows while the other tightens the screws, to prevent tilting or shifting the separator. Any rocking or twisting of the appliance will result in unnecessary pain, and undue injury to the soft parts. Another serious limitation to the separator lies in the danger to enamel margins when the jaws impinge close to the cavity. The enamel may thereby be checked in such a way as to jeopardize the usefulness of the filling without the operator's observation of the fact at the time. Cases for the separator should be selected with care and judgment, and due consideration for the patient must invariably accompany its use. With these precautions, it is really a humane appliance and is capable of a large range of usefulness. It is not only indicated for gaining space between teeth, but may frequently be used, where space has already been obtained, for the purpose of holding the teeth firm during the operation. This avoids in large measure any soreness from malleting, and also prevents the teeth from gradually dropping together while the filling is being inserted.

Fig. 4.

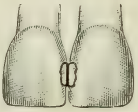
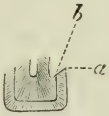


Fig. 5.



Wooden wedges may also be used occasionally for this purpose, but the difficulty with wooden wedges lies in the fact that they are usually injurious to the gum tissue in the interproximal space, and their entire wedging force must be exerted immediately instead of gradually. Whenever a wooden wedge is used to hold the teeth firm during an operation it should be made as narrow as possible, and the rubber-dam should be stretched well labially before the wedge is inserted, to overcome the tendency which the dam otherwise would have of dragging the wedge out of place.

## Detail of Cavity Formation.

After frail enamel walls have been broken down and the margins extended to the desired outline, all decay should be removed and the cavity given such form that the filling will be retained securely in place.

*The cervical wall.*—This wall should be extended rootwise sufficiently to carry the margin of the filling well under the gum in accordance with Fig. 1. The line *d* represents the gum as it comes down between the teeth in the interproximal space, and the outline of the filling *c* shows the cervical portion well under the gum. The reason for this extension is the well-known fact that wherever we have the cervical portion of a perfectly inserted filling covered by healthy gum tissue, we will never have recurrence of decay at that point.

The cervical margin of approximal fillings has often been alluded to as the "vulnerable point," even when fillings were well inserted, but this is hardly in strict accordance with facts. In reality decay seldom recurs along the cervical margin proper. It usually begins at the cervico-labial (or buccal) and cervico-lingual angles. From here it may extend and involve the entire cervical margin, but the initial point of failure is usually at the angles. This is because there is a lodgment-place in these positions for deleterious matter to form undisturbed by friction from the tongue or lips, and unprotected by gum tissue. In this small sheltered harbor the micro-organisms of caries create their films and attack the enamel. No tooth may be considered safe from recurrence of decay around approximal fillings unless the cervical wall has been carried sufficiently rootwise to bring that portion of the filling under the gum, and the cervico-labial and cervico-lingual angles have been extended to a point where these margins of the filling are kept clean by friction.

This form of extension results in the cervical wall being flat labio-lingually, and this is believed to be desirable for other reasons than those of prevention. A filling is more easily built upon a flat base than upon a curved base, and is more secure from dislodgment when completed. The prevailing custom of forming the cervical wall on a curve labio-lingually is accountable for the fact that many operators find their fillings rocking when partly inserted, and it has also led to the necessity of drilling pits more or less deep (and more or less disastrous) in the cervical portion of the cavity. To subserve the best ends in anchorage the cervical wall should also be made flat mesio-distally, with a slight incline rootwise as the cervical wall approaches the axial wall. In some instances this incline may take the form of a shallow groove in the dentin extending from the cervico-labial to the cervico-lingual angles of the cavity, and carried somewhat into the lingual wall at this point to facilitate the starting of the filling. It should not be carried to any extent into the labial wall, on account of the difficulty of adapting gold into an inaccessible undercut such as this would be.

*The lingual wall.*—As has already been intimated, this wall should be freely cut away if frail. The temptation to leave it for the purpose of having something to build the gold against in the insertion of the filling has proved the stumbling-block of many an operator. If sufficiently supported by dentin it need not be extended farther than is necessary for prevention, but in some instances it must be cut away nearly on a line with the axial wall.

Especially is this true in those cases where for esthetic reasons it is considered desirable to leave the labial wall standing and insert the filling mostly from the lingual aspect. The difficulty of doing a perfect and permanent operation in this way renders these cases rare, and limits them sharply to cavities having a strong, thick labial wall.

When the lingual wall is cut away freely, the only attempt at retention along this wall should be as it approaches the cervico-axial angle and the incisal angle. Here a right angle may be made with the axial wall, or in the cervical extremity of the lingual wall the groove previously mentioned in the cervical wall may be diverted at right angles into the cervical third of the lingual wall. This not only aids in retention, but provides a cul-de-sac into which may readily be secured the first pieces of gold. Deep grooving should generally be avoided in these cavities on account of the uncertainty of gaining perfect adaptation and density of the gold in the bottom of grooves, and also because of the consequent weak walls to the cavity; but in the cervico-lingual region these objections are not strictly operative. Direct access may be gained with a plugger, and the bulk of tooth-tissue covering the pulp at this point admits of judicious grooving without creating weak walls. But in no instance, even where it is deemed advisable to leave the lingual wall standing, should the groove be extended throughout the length of the wall. The most that should be done in the middle third of the wall is to make more or less of an angle between that and the axial wall.

*The labial wall.*—The same general rules apply to the formation of this wall that have just been outlined for the lingual wall, except that grooving is contraindicated in any portion of its length. In cases where possible an angle may be formed with the axial wall to increase the security of anchorage, and especially should this be done in the cervical and incisal thirds.

*The incisal angle.*—This should be formed at right angles with the axial wall. It should never be deeply grooved, nor should a pit be drilled at this point, as is frequently done. To assist in retention of the filling it may be slightly inclined toward the incisal edge of the tooth as it approaches the axial wall.

*The axial wall.*—The form of the other walls practically determines the shape of this wall. It should be as nearly as possible at right angles with the others, leaving in all cases as much dentin covering the pulp as is consistent with strength of the filling and a thorough removal of all decay.

*The enamel margins.*—The final step in the preparation of the cavity is the treatment of the margins. The enamel should be so beveled that the peripheral ends of the rods are cut off and the dentinal ends covered with gold when the filling is inserted. This calls to mind the necessity for introducing two terms to properly designate enamel margins. In reality there are two margins to enamel, and in cavities such as we are considering a clear distinction between the two is important. There is the enamel margin at the periphery of the tooth, and the enamel margin next to the dentin. For want of better terms these may be designated the *peripheral enamel margin*, and the *dentinal enamel margin* (Fig. 5, *a* and *b*).

If in all cases the enamel could be left well supported for considerable depth by dentin the distinction in terms would not seem so important, but this is not always possible; and where such is the case the treatment of these two margins is dissimilar. The peripheral margin should be given a distinct bevel, while the dentinal margin should be slightly rounded.

The necessity for beveling enamel relates to the peculiarity of its structure. It is composed of rods standing with their ends on the dentin and radiating out toward the periphery of the tooth in a more or less regular manner. The enamel when supported by dentin, and with no break in the continuity of its structure, will sustain great stress without fracture, but when undermined by decay it is easily broken down. This break is usually in line with the enamel-rods, which indicates that the cement-substance holding the rods together is not very strong. If, then, the peripheral ends of the rods are left standing around a filling while the dentin is gone, and possibly the dentinal ends of the rods dissolved out by caries or burred away in the preparation of the cavity, it is readily seen that the short peripheral rods must sooner or later drop out, even if they escape crushing in the insertion of the gold. This admits of a leak around the filling. To make perfect margins the enamel should be so beveled that there are no short rods at the periphery. But this bevel must not be too acute, nor must the peripheral margin be rounded. Either of these conditions would result in the filling-material assuming too attenuated a form at the edges, which would admit an element of weakness to the filling. In every instance where the dentinal enamel margin is at all prominent it should be slightly rounded, as already indicated, to facilitate the perfect adaptation of the gold against it. (Fig. 6, *a*, peripheral enamel margin beveled, *b* dentinal enamel margin rounded, *c* filling-material protecting margin.)

The marginal outlines of these cavities should represent symmetrical and graceful curves that will not offend the eye of the artist. In the formation of the walls of the cavity, angles have been recommended at various points for the firm retention of the filling, but angles are never permissible along the margins for esthetic reasons. As the cervical margin joins the labial or lingual margin it should not be at a sharp angle, but on a curve. This curve may in some instances be rather short, but it must invariably be a symmetrical and definite curve. The outlines along the labial and lingual walls should be true and clearly cut to present the most artistic appearance. The dentist should aim not only to do serviceable operations, but to do beautiful ones as well.

*Technique.*—The first step in the operation is to break down unsupported enamel margins. This may best be done with suitably formed chisels, made sharp. In some instances the thin overhanging labial wall may be cleaved away to advantage with a short, strong hatchet excavator. The blade must not be long enough to penetrate into the cavity sufficiently to expose the pulp or impinge on sensitive dentin as the enamel is broken in. Care should be exercised especially in the early stages of the operation not to shock the patient. A false movement at this time will do much to unnerve the average individual. If it is found necessary to give pain in an operation, it is best if possible to defer that particular part of the work till the patient has been some minutes in the chair. It will ordinarily then be better tolerated.

After weak walls are broken down the cavity should be extended to its proper outlines. This can usually be done rapidly and effectively with sharp burs, either round or oval as the case demands. In the use of burs for this purpose—or in fact for any purpose—due regard must be exercised for maintaining the bur precisely at the angle and in the position required. No operator should venture to use an instrument like the dental engine without previously having acquired an absolute control of the hand-piece, and having studied carefully its dangers and limitations as well as its legitimate uses. The failure of operators to properly manipulate the engine is accountable for much of the prejudice against it. The principal dangers to be guarded against in extending these approximal cavities in incisors relate to the displacement of the bur by catching the blades against the margins of enamel and carrying the bur either into the cavity or out across the surface of enamel. To prevent this the hand-piece should be firmly grasped and the bur applied to the margin without too much force, and at such an angle that it may be maintained in position.

FIG. 6.

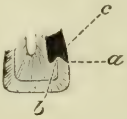
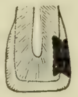


FIG. 7.



If the cavity is one which looks toward the operator, the bur may be held at right angles with the long axis of the tooth, and in that position it is not likely to slip. In cavities looking away from the operator where the position of the bur is more nearly parallel with the long axis of the tooth, the shank of the bur should have a bearing on the surface of the enamel in such a way that the bur will be braced against the displacement while the blades are playing along the margins.

After the cavity has been extended to the desired outlines the decalcified dentin should be removed. This is ordinarily best done with thin, sharp excavators, though in some instances the same bur which extended the outlines may be used for a few revolutions to remove the diseased tissue. In those cases where the decay has penetrated to any extent, this work should be done with spoon excavators to avoid needless pulp-exposure. An instrument with a sharp angle, as in the hatchets and hoes, is more likely to penetrate too far and puncture the pulp than one with a rounded form such as the spoons.

When the carious tissue is removed the walls should be shaped for anchorage. For the cervical wall an inverted cone bur of suitable size should be placed with its end against this wall, and the shank as nearly as may be parallel with the long axis of the tooth. It is then carried labially and lingually along the cervical wall till the proper form is secured. The end of the bur leaves the cervical wall flat, and produces nearly a right angle between the cervical and axial walls. This angle, while not strictly speaking a right angle (unless the bur is held perfectly parallel with the tooth), is sufficiently so for practical purposes, and the form left by the bur presents a surface parallel with the end of the plugger point, thus facilitating the adaptation of the gold against this wall. In cases where necessary the cervical wall may be slightly grooved with the bur, but in every instance it must be used with care and judgment to avoid too deep cutting and pulp-exposure.

As the bur reaches the cervico-linguo-axial angle of the cavity it may be withdrawn crownwise along the cervical third of the lingual wall, making a slight groove at this point as before advocated. This groove formed by the side of the bur will be rounded. If deemed advisable it may be squared out with an excavator to an angle with the axial wall.

The labial wall is formed by placing the inverted cone bur with its end against the axial wall and its shank at right angles with the long axis of the tooth. By carrying the bur laterally along the labial wall from the cervical wall to the incisal angle the side of the bur will give form to the labial wall, and an angle will be created between that and the axial wall.

The incisal angle of the cavity may be formed, in cases where there is suitable access, by carrying the inverted cone bur down into this angle, cutting sidewise, with its end facing the axial wall. The form of the bur gives the required angle between the incisal and axial walls. Where the bur cannot be placed in the proper position to accomplish this purpose, the incisal angle may be formed with small, delicate excavators, and in the entire formation of the cavity indications may point to the use of excavators instead of burs. It is believed that with sharp burs carried in a hand-piece under perfect control more effective cutting can be made in a given time than with hand instruments, and yet the operator must not lose sight of the advantages of excavators under certain conditions, nor enslave himself to the prejudiced following of any one method under all circumstances. He should study the mechanical and the nervous requirements of the case, and readily adapt himself to the most serviceable plan of procedure.

The enamel margins may be beveled with a fine-bladed round bur used in the manner advocated for cavity extension, or they may be planed off with delicate sharp chisels, as the case indicates.

## General Considerations.

It may be noted that some of the suggestions here advanced relative to cavity formation appear somewhat radical when compared with the methods generally in vogue in the profession. The advocacy of angles between the walls of these cavities may impress many as being illogical and impracticable in view of the orthodox teaching on the subject. Curved outlines to cavity walls have usually been suggested whenever there has been any suggestion at all. This has been done with a view of making a cavity into which the filling-material might easily be adapted, and one of the first objections likely to be urged against the formation of angles is the supposed difficulty of adapting gold into such angles. This question of the non-adaptability of gold to angles has been much overdrawn. It is simply a matter of proper manipulation, with pluggers of a suitable form to carry the gold into the angle. It need not here be stated that a round plugger is not the form for this purpose.

Gold can easily and accurately be adapted into a sharp right angle, as has repeatedly been proved by experiment. The advantages of making angles in cavities relate to the ease with which fillings may be started in such cavities, and the unquestioned security of anchorage without undermining and weakening the walls. Fillings built upon flat bases have a greater stability against displacement under stress than those built upon curved bases, and the gold is less likely to rock during its insertion.

It will be found that in the practical application in the mouth of the methods here advocated it is seldom that a perfectly sharp angle is ever made in one of these cavities, especially in any position where it is at all difficult to fill. The principle involved is merely the formation of flat walls instead of curved walls, and the operator who makes the trial of building fillings against flat walls after being accustomed to curved walls will not long remain in doubt as to which is the preferable method. There is a sense of security to the work as it progresses which is never experienced when the walls have been formed in curves.

Fig. 7 shows a longitudinal section of a tooth mesio-distally, with cavity formed and filled. It will be seen that the filling is mortised or dovetailed into place, with no deep grooves or undercuts to weaken the walls.

(To be continued.)

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# DEGENERACY, IN ITS RELATION TO DEFORMITIES OF THE JAWS AND IRREGULARITIES OF THE TEETH.

BY EUGENE S. TALBOT, M.D., D.D.S., CHICAGO, ILL.

(Read before the First District Dental Society of the State of New York, March 8, 1898.)

I PROPOSE in the short space of time allotted to me this evening to give you as briefly as possible the results of my twenty-one years of constant application to the study of the etiology of the deformities of the jaws and teeth.

In order to accomplish the results obtained, the line of study and investigation has carried me entirely outside the narrow limits of our specialty into the broad realms of embryology, neurology, anthropology, sociology, criminology, etc., requiring many visits to the public institutions of this country and Europe. Although

Morel, of France, fifty years ago laid down the law of human degeneracy, and Lombroso and others commenced their investigations some ten years later, very little if anything had been written about the jaws and teeth until many years afterward. The absurd theories (that of the criminal type) advanced by Lombroso were so antagonistic to the observations of the other investigators that very little interest was awakened until the last few years in the study of this subject. These investigators must have considered the jaws and teeth of very little consequence, since most attention has been given to brain development, its various lesions and idiosyncrasies, rather than to degeneration of the jaws and teeth.

For two decades Spitzka,* of New York, and Jas. G. Kiernan,† of Chicago, have furnished more facts along these lines and awakened more interest than any other writers.

Basing my researches on the principles thus outlined, in a paper read before the Section of Neurology and Medical Jurisprudence of the American Medical Association, May 5 to 8, 1896, entitled, "The Degenerate Jaws and Teeth," and published in the *International Dental Journal*, February, March, and April, 1897, I have shown that these structures are more important indices of the physical nutrition of the individual, from conception until the skeleton has obtained its growth, than any others. I am free to say, therefore, that the treatment of the structures of the body which we, as dentists, have chosen as a life-calling, are of much more importance, in many respects, than the filling of teeth and supplying artificial substitutes.

It may not have occurred to you, students and fellow-practitioners of dentistry, that the mere filling of teeth, their substitution, and the treatment of so-called pyorrhea alveolaris are by no means all that will be required of the future dentist. The coming dentist will be required to spend most of his time in expansion of jaws and correction of irregularities of the teeth. It will not do, then, for the future dentist to say "that he does not care for the cause, it is enough for him to know how to correct them," as has been already remarked by two specialists in this branch of dentistry. We must know, then, the cause in order to treat successfully deformities of the jaws and teeth, as well as other lesions of the body.

Kingsley, in his work upon "Oral Deformities," in 1880, collected all that was known up to that date upon etiology of irregularities of the teeth. In glancing over its pages I was struck by the statement upon page 36 in which he says, "By a comparison of my observations of idiots with those of all ranks and conditions in life, as represented in our public schools, I found that, taking the idiots as a class and comparing them with the lower orders of society as found in this country, there were no more irregularities in the one than the other. In both cases did I find that amply developed jaws and teeth were the rule, and narrow, pinched, and V-shaped maxillæ and dental arches were the exception."

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*"Somatic Etiology of Insanity."

†*Alienist and Neurologist*, 1882-1898; *Journal of Nervous and Mental Disease*, 1882-1886.

This paragraph stimulated me to take up the study with a view of ascertaining the causes which produce these deformities. Starting out from a narrow specialty, with a limited knowledge of what had been done and what was being done in other fields, it is gratifying to me to be able to announce that my investigations, although made along different lines, have resulted in the same conclusions as to cause and effect of degeneracy as those of investigators even in fields of science far distant from dentistry. The evolution of man has been going on ever since his creation. Whether you believe that man sprung from the lower orders of animal life or not, should we know nothing of his earlier history our present knowledge of evolution and atavism is sufficient to settle the question that man, in many ways, did resemble the lower animals. These laws are just as fixed in this respect as any of the laws of the universe. Let me illustrate. Under my observation is a young man, living in another city, whose head resembles that of an anthropoid ape. He has a small head, with exceedingly receding forehead, protruding superciliary ridges, small eyes with large sockets, very high and large cheek-bones, small flat nose, excessively developed and protruding jaws, massive body and rami, saddle upper and lower jaws, excessively large teeth, the cuspids prominent. The size of the occipital region is the only line of demarkation between his skull and that of an ape. Very early he contracted the habit of being intimate with domestics, which later in life necessitated his being sent from home, his mother being unable to retain proper help. He contracted the morphin and cocain habits, and at the age of twenty-nine landed in an insane hospital. Degeneration has been in the family for a number of generations.

While all the structures and organs of the body are subject to degeneracy, the head, face, jaws, and teeth reveal the stigmata more forcibly, because the least deviation can be observed. Hence, the face, jaws, and teeth are more important in the study of criminal anthropology and degeneracy than any other part of the body. When arrest of the face takes place, the shape reverts to that of the anthropoid ape.

In ascension of the scale of evolution from the lower vertebrates, gradual change in the shape of the head and face is found. The forehead becomes more prominent and the jaws recede until we reach the type of face so much admired in Greek art, that of the Apollo Belvedere. While the lines in this type of face may be pleasing to some, no one, at the present time, would select it as an ideal type of intellectuality. Indeed, from my studies of marble and bronze statues in Rome, Naples, and Athens, I am of the opinion that this was at that time, as well as the present, an ideal face borrowed from the Egyptian type, since the busts of the Roman Emperors, as well as nearly all ancient Greek and Roman statues, together with skulls found at Pompeii and Herculaneum and ancient tombs in the Appian Way and at Athens, show more intellectuality in protruding foreheads and receding jaws. That I am correct in the opinion that the evolution of this type of face long preceded the Greeks is shown by the Village Sheik, one of the earliest and most beautiful Egyptian figures, nearly six thousand years old.

The evolution continued until the human face reached the perpendicular line as laid down by Camper, which in my mind represents the highest mental and physical development. This period in the evolution of the face and jaws is the one in which we, as dentists, become interested. It is the period at which the service of the dentist in his relation to the evolution of the face begins. Up to this time the human jaw has been sufficiently large to contain thirty-two sound and healthy teeth. Some years ago, by measurements of a large number of jaws of ancient and modern skulls,* and of people now living in localities where these skulls originally belonged, I found that there had been a decrease in size of one-half an inch in the past one thousand years. In cases of arrested development and contracted dental arches, at the present time, by actual measurement, the decrease is from one inch to 1.75.

Anterior development of the brain and recession of the jaws are still going on, and here a peculiar complication of things is found. The bones of the body develop from a nucleus, while the teeth calcify from the periphery, and owing to the very early period at which calcification takes place, they are not influenced by individual defects after birth; hence, they are the same size to-day that they were 3000 (Michaels, of Paris, says 30,000) years ago. It is now easy to see what must result, the jaws being too small for the long diameter of the teeth,—a break in the dental arch must take place. Hence, irregularities of the teeth ensue.

Visit our public institutions in this country and you will find very few, if any, contracted jaws among the foreign degenerate classes. On the contrary, among the English-speaking people this stigma is very common. This naturally caused me much thought and critical analysis as to its significance. In planning my trip to Moscow this past summer, I arranged to visit various cities and make observations of the degenerates in the public and private institutions. The objective points of interest were the prisons, insane hospitals, schools of idiocy, foundlings, etc. The features of the soldiers, police, and cabmen, as well as the citizens themselves, were also noted for the purpose of comparison. Every country was visited except Portugal and Lapland. In Spain, Italy, Greece, Turkey, Asia Minor, Roumania, Russia, Finland, and Switzerland contraction of the jaws was not observed; in Germany, Denmark, Austria, Holland, France the percentage was very small, while in Norway, Sweden, and England the opposite was found to be the case.†

If, now, Camper's triangle is applied to the face it will be found that among the different races of the world a majority of the faces fall short of the perpendicular line, while most Scandinavians and Anglo-Saxons have reached it; the Swedes and English in a majority of cases have passed far beyond it. The old New England, as well as the older families along the Atlantic coast, have also reached the same angles as the English, but owing to intermarriage with different nationalities and the newness of our middle and western country, this angle has not advanced so rapidly.

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*See DENTAL COSMOS, 1892.

†See report in *International Dental Journal*, January, 1898.

Standing on the corner of Piccadilly Circus and Regent street, London, I casually examined the faces of the passers-by, and found that in ten thousand faces eighty-two per cent. had angles beyond the perpendicular. In an examination of three thousand school-children in and about London, ninety-three per cent. had an angle beyond the perpendicular. It will be seen, therefore, that in the coming generation the percentage of the recession of the face and jaw is greater among the English than the previous generations. A solution of the question, "Why do the Swedes, English, and Americans have more arrest of development of the face and jaws, contracted dental arches, irregularities of the teeth, than other nationalities?" has now been found, and having settled this question, let us look at another phase of it.

Degeneracy of the human body is brought about by many vicious habits in the male, female, or both—namely, excesses of all kinds, worry or fright, exhaustion, as well as ill-fed mothers, thus affecting the nutrition of the fetus. After birth the eruptive fevers and all constitutional diseases affect the child in part or as a whole, which may be only temporary or remain permanent. In no part of the body is the effect so marked as upon those structures which are naturally degenerating, such as the face, jaws, teeth, and appendix vermiformis. Thus, it is very common for a child to be born with a well-developed face or appendix, but at any period before the sixth year become stricken with constitutional disease and have complete arrest of the face and jaws. This condition afterward becoming inherited is a splendid example of the inheritance of acquired defects.

People suffering from hypertrophy of the nasal bones, mucous membrane, polypi, or appendicitis are in a large majority of cases degenerates. So-called high and contracted vaults, then, are not due to mouth-breathing, but all of these conditions are the result of the interaction of evolution and degeneracy. The vault is not pushed up, but is built downward by a lengthening of the alveolar process owing to the long rami. When there are more than thirty-two teeth it is atavism, a return toward the lowest primates possessing forty-four teeth.* Where arrest of the jaws takes place there is not room for the teeth. As a result in the order of evolution a break must take place at one or two points, first in front, forming the V or some of its similars, producing a reversion or atavism toward the reptilian type; second, at the sides, forming a saddle or some of its similars, producing a reversion or atavism toward the carnivorian type. The formation of these deformities is purely mechanical, depending entirely upon the order of the eruption of the teeth. Therefore, the arrested jaw is inherited, but not the deformed dental arch. I have never seen models of parent and

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*See "The Degenerate Jaws and Teeth," *International Dental Journal*, February, March, and April, 1897.

child alike. In a collection of three thousand models no two were found to be alike.

Nature is trying to compensate for the degeneracy of the jaws by dropping the third molar and lateral incisor; hence, whenever jaws are found with these missing it not only indicates degeneracy at conception, but arrest of the jaws as well. If they are imbedded in the jaw it indicates the same condition, but not to so marked a degree.

# THE TOXIC EFFECT OF COCAIN, INDUCED THROUGH CATAPHORESIS, APPLIED TO A PULP PREPARATORY TO ITS REMOVAL.

BY M. W. FOSTER, M.D., D.D.S., BALTIMORE, MD.

(Read before the Dental Society of the State of New York, May 12, 1898 )

MR. PRESIDENT AND GENTLEMEN:

One collected fact is more potent for the eradication of error than a number, however important, if these are not brought forward. I shall in this paper relate as concisely as possible an occurrence which I am sure will place under suspicion at least some of the theories advanced in reference to the toxic or non-toxic effects of cocain upon pulp-tissue with the aid of the cataphoric current. Under the conditions hereinafter named, are the probabilities of the toxic effect of cocain so thoroughly understood as our professional brethren would have us believe?

On the fourth day of April a married woman, a student in the junior class of the Baltimore College of Dental Surgery, was suffering from an exposure of a pulp in the left upper second bicuspid, distal surface, and applied to the demonstrators in charge of the infirmary for relief. After an examination, it was decided that under existing conditions it was necessary to destroy and extirpate the pulp. On the request of the patient, who had witnessed in clinical practice a number of operations of extirpation of pulps with an application of cocain solution with the aid of the cataphoric current, it was decided to proceed as usual in such cases. The cavity extending a line or two above the gingival border, it was necessary that the gum be forced above by wedging. This was done, after which the rubber-dam was carefully adjusted and clamped. This operation was quite painful; the patient's expressive contraction of the lines of the forehead and eyelids, as well as utterances, was evidence of this fact. A pellet of cotton saturated with a thirty per cent. solution of cocain hydrochlorid was placed within the cavity. The negative pole was placed on wrist; the positive pole applied to the cotton; strength of current, five cells, continued fifteen minutes. On testing for sensibility after that time, the pulp was found active. As the cotton was dry, a pellet of cotton was saturated with the cocain solution and again applied within the cavity. After ten to twelve minutes from the last application, the patient commenced touching the tips of her fingers to the thumb. On being asked why she did so, she remarked that they felt precisely as if they were asleep. When asked if she felt this sensation in the right hand, she answered, "No." The band being placed on the left wrist, these questions were just answered when the patient commenced a peculiar howling sound which attracted the attention of all in the infirmary. The cotton from cavity, and the rubber-dam, were immediately removed; brandy was administered to the patient by the mouth. The symptoms becoming more alarming, brandy was hypodermically injected, and friction to the body applied. This condition lasted from 3.30 P.M., the time the last application of cocain was removed, until 8.15 P.M. The patient was removed to her home in a carriage, and the rigidity of the body was so pronounced that the carriage door could not be closed, as her feet remained slightly through the opening.

The patient being requested to call on me, did so, when the following questions were asked and answered:

*1. Q.* Were you conscious during the operation and afterward?

*Ans.* I was perfectly conscious, with the exception of the time I was removed from the chair to museum room,—about one minute,—although I could not speak.

*2. Q.* What were your most pronounced sensations?

*Ans.* I had no feeling lower than my neck; was conscious of having a head,—the sensation of *it being* the only part of me.

*3. Q.* Why couldn't you *sit* in the carriage when placed in it?

*Ans.* I was so rigid that I had to be held up straight, and the angle at which I was held made my feet slightly protrude outside of hack.

*4. Q.* At what time did you regain the power of speech?

*Ans.* At about 8.15 P.M., after twenty drops of digitalis had been administered.

*5. Q.* How was your throat affected?

*Ans.* It was exceedingly dry all that night and the following day.

*6. Q.* Did you experience any pain in the eyes?

*Ans.* Yes, they were quite painful, and are still affected with dimness of vision.

*7. Q.* Were your ears affected?

*Ans.* Yes, but I am recovering more quickly my hearing than my eyesight, which is still imperfect.

When it is considered that the patient was being treated before a class of students more or less familiar with the methods of application and with the action of cocain, it would seem very probable that all the precautions that are usually taken were enforced. Notwithstanding, we have here a well-marked case of cocain poisoning.

In Ringer's "Therapeutics," page 595, Paul Bert asserts "that the action of cocain is purely local, extending only so far as the drug actually comes in contact with the tissues." I am of the opinion that the case just presented, as well as a number of others which later on will be referred to, and the consensus of opinion of a number of writers on this subject, refutes Mr. Bert's assertions. Let me refer you to the *Medical Record*, page 518. Dr. Tibone says that idiosyncrasy and intolerance are manifested more often for cocain than for any other anesthetic, and that, from therapeutic doses, unpleasant symptoms frequently arise, *due* to the *general* and not the *local* action of the drug. Here is a difference of opinion: I refer you to Brunton's "Therapeutics," page 151. "A gentleman, a teacher of physiology, describes his own experience. He wished to have a tooth extracted, and the dentist injected a *lot* of cocain into the gum. It had a curious effect upon him, completely removing all power of movement, although it left his sensorium unaffected. He was unable to move, unable to breathe, and they had to maintain artificial respiration for many hours, after which he completely recovered."

The second case shows the action of the drug when injected, and is as conclusive as the first in reference to its toxic action constitutionally.

I think it is needless to occupy your time in presenting other cases which are on record and quite numerous.

If the cases quoted prove anything, it is that in the first case cocain poisoning was induced and brought on by the toxic action of this drug, or, in other language, if the current of electricity had been the only application to the pulp, the symptoms quoted above could not have occurred.

Now, the question arises: If from five cells a current is of sufficient voltage to maintain the drug intact, or as cocain hydrochlorid, and have it act so powerfully, what number of cells is necessary to commence decomposition of this drug and have a different or nil result? Solutions of cocain hydrochlorid, like those of similar salts, are decomposed by suitable electric currents into the acid which appears at the negative, and the base which separates at the positive pole.

The power of an electric current to act decomposingly depends largely on the electro-motive force. A current of relatively high voltage and of very low amperage causes very little decomposition, while with even low voltage and a high amperage the result is brought about.

If, for instance, a thirty per cent. solution of cocain hydrochlorid is subjected to a current from six Mesco dry carbon-zinc cells, which represent about six volts and one ampere, the decomposition of the salt proceeds quite rapidly, a white crystalline deposit of cocain being separated on the positive electrode, while the presence of free acid may readily be shown by means of litmus paper. On the other hand, the current obtained from a twenty-five dry-cell silver chlorid battery, representing as much as twenty-five volts, but less than one-quarter ampere, is practically without action. I am aware that the greater number of those present know this to be a fact, but if there should be even one doubter, I have here a battery of six Mesco dry carbon-zinc cells, representing six volts and one ampere, and a thirty per cent. solution of cocain, and a test tube and litmus paper; in from one to two minutes it will show the decomposition accomplished.

You will be obliged to take my *ipse dixit* that this decomposition does not take place from the other battery referred to, or only very slightly.

Now, gentlemen, I am not discussing the question of electrical currents or batteries, except in so far as it relates to this case. This has been so ably discussed by a number of men in and out of the profession (such as Dr. Morton, whose book on this subject is of great value; Dr. Price, who has given us data of unquestionable value; Dr. Neiswanger, Dr. Gillett, Dr. Curtis, and a number of others who are deserving of honorable mention) that, with my imperfect knowledge of electricity, I should not dare to bring myself forward in this connection.

Dr. Carl Ludwig Schleich, of Berlin, states, "from experiments directed toward finding, if possible, a method of employing cocain in combination with other substances which would free it from these annoying and not always dangerous after-effects," that in conducting these experiments the eminent gentleman did not try them upon animals, but upon himself, and injected *into* and not *under* the tissues of the cutis. The result was surprising. He found that solutions of cocain one hundred per cent. weaker than usual, two to five per cent. solutions, produced complete anesthesia, and, apart from a burning sensation at the moment of injection, distilled water produced complete anesthesia.

A combination of the solution of sodium chlorid (0.2 per cent.) with cocain resulted in the discovery that dilutions of cocain of 1 to 10,000, which could not have been injected painlessly in combination with water, produced anesthesia without painful sensations. It was demonstrated from further experiments from the same source that methyl-violet, caffein, carbolic acid, antipyrin, etc., will produce as complete an anesthetic wheal as does cocain.

The deductions from the above are pointed and I think conclusive: First, cocain is liable (when applied to the pulp with the aid of the cataphoric current) to produce constitutional symptoms of cocain poisoning. Second, this is not liable to occur when cocain is applied to the pulp, except in rare cases of hypodermic injections. Third, that cocain does not kill the pulp, but paralyzes it for a longer or shorter time; recovering sensibility of pulp evidence of this fact. Fourth, that other drugs less dangerous may be used, or weaker solutions of cocain with sodium chlorid. Fifth, if decomposition of cocain takes place, its action is nil.

Cocain kills by causing cessation of respiration, since heart-paralysis takes place subsequent to respiratory paralysis. Battesten states as antidote to its toxic effect in spastic form, chloroform should be administered. For psychal excitement, chloral is indicated; for respiratory paralysis, artificial respiration; in all cases of poisoning, elevated position and inhalation of amyl nitrite. For syncope, give excitants.

Dr. Curtis gives volasem as an antidote to cocain poisoning,—one or two drops in water prior to the hypodermic injection of the drug.

# CORRESPONDENCE.

## GOLD AND CEMENT FILLINGS.

To the Editor of the Dental Cosmos:

*Sir,*—In section "Hints, Queries, and Comments" of the Dental Cosmos for May, 1898, there is a contribution entitled, "A Somewhat Novel, but Most Effectual, Method of Filling Teeth," by H. S. Lowry, D.D.S. The author, after stating his method, says that as far as he knows it is a new one, but I can assure him that this method of filling has been practiced for several years by a number of dentists in Chile, including myself, with more or less good results; but if the author will try the following method, I think he will obtain still better results.

Rubber-dam in place, prepare cavity, retaining-pits not necessary; then varnish bottom of cavity with resin, cut in chloroform, and commence to pack in the gold, it does not matter much how, so long as you get the cavity full; by holding filling with point (an old excavator will do) there will be no fear of the filling getting loose or rocking when flush with the cavity edges. Take small pieces of leaf gold and burnish to right contour, then with plug-finishing files smooth off; this will harden the surface and amalgamate the molecules of gold into one solid mass, bringing the edges of the filling into close contact with the edges of the cavity; use polishing strips if necessary. If the cavity has been prepared with very little undercut, the filling will be easily removed, taking care not to damage the edges in so doing.

Then mix cement to a creamy consistence, and fill the cavity and return the gold plug to place. Harvard cement is very good on account of its smooth working and great stickiness.

When the cement has set, finish and polish by any mode the operator is accustomed to.

By this method you will have a perfect filling, no dark edges around filling in a few months, perfect adaptation to edges, impossibility of liquids filtering between tooth and filling, also no danger of filling disintegrating or flaking off, as is possible with the author's method on account of evaporation of acid in cement, or particles of the same incorporating with the gold plug.

Where there is danger of irritation of the pulp from the acid of the cement, incorporate one-third or less of hydronaphthol with the powder, as recommended by Sidney S. Stowell, D.D.S., in the Dental Cosmos for November, 1897.

Where cavities are shallow, before putting in cement they may be made deeper with a small bur in the engine; where the reverse, with care, a small portion of the plug may be cut off with wedge cutters.

Of course ample space is necessary for the removal of the plug, so as not to injure the edges in so doing.

Wm. Edwin Perrett, Dentist.

Valparaiso, Chile, S. A.

# PROCEEDINGS OF SOCIETIES.

## NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, April 19, 1898, at the New York Academy of Medicine, No. 17 West Forty-third street; the president, Dr. S. G. Perry, occupying the chair.

### REPORT OF THE CLINIC COMMITTEE.

Dr. J. F. P. HODSON. I have to report an exceptionally fine clinic this afternoon, the clinicians being Dr. Van Woert, of Brooklyn, and Dr. Shumway, of Plymouth, Mass. I would ask the president to request the gentlemen to report their own clinics.

Dr. F. T. VAN WOERT. The method employed this afternoon was that of fitting a platinum cap over the root. A Logan crown, the heel of which has been ground away, is then fitted to place over this cap, the pin being simply pushed through without soldering, and porcelain is baked in the matrix formed by the platinum and crown. By stripping off the platinum, the crown has the advantage of having as nearly perfect adaptation to the end of the root as can be obtained. I think the Logan crown is the best one we have for the six anterior teeth, and I might say it is also applicable to the bicuspids, with the addition of a band of platinum, and cutting the pin off to about one-eighth of an inch in length. In crown work I employ porcelain almost exclusively in preference to gold solder, because I think it is stronger and more artistic, and the adaptation can be made more perfect than in any other way I know.

The PRESIDENT. This adaptation to the root before it was set with cement was so perfect that it could not be moved a particle, and it was with some difficulty that it could be withdrawn. I would ask Dr. Van Woert if it is his intention to strip the platinum off before setting, in all cases.

Dr. VAN WOERT. Yes, in my private practice. I did not do it this afternoon, because there was a slight defect. The porcelain was not fused down to a perfect mass as it should have been.

Dr. T. D. SHUMWAY, Plymouth, Mass. I am very much interested in the subject that was just discussed, and I should be still more interested in it if I had to resort to dovetails, retaining pits, and undercuts and the mallet to put in a filling, after I had my cavity prepared, because I should expect a great many more dead teeth than I get from the process which I use. In the method which I have been trying to introduce, of course the basic principle is to find a material that is grateful to tooth-substance. As Dr. Kirk has said that the investigations of Miller, Black, and others have demonstrated to their satisfaction that the cause of caries is from without, there is one thing that I think is sure, and that is, that the cause of health in teeth is from within. It comes through mastication, deglutition, digestion, and assimilation,—so that in order to meet the difficulty or the disease with which we have to contend, we must recognize the processes by which a tooth is grown. During one hundred years there is only one material which has stood the test of time, and if not possessing therapeutic properties, it at least is neutral and allows the process of assimilation to go on underneath. That material is the metal tin. The most dangerous material has been and is cohesive gold. There is no question about that in my mind. At the same time, there is no material which we have that is so indestructible and possesses so many advantages as cohesive gold, because we can restore what has been lost. It supplements the limitations of non-cohesive gold. In the introduction of non-cohesive gold, it is necessary to have four good walls to retain the filling. With cohesive gold, if we have three good walls, we can restore the fourth. So that cohesive gold rightly used is one of the greatest benefits that has been conferred on the dental profession, and upon those who are so unfortunate as to be obliged to submit to dental operations. It has been my study for twenty-seven years to see how I could overcome the objections which every one must admit obtain in the use of cohesive gold, and how it could be made to serve the purpose for which we desire it. During that time many of my experiments have been failures. If my practice had been large, and my expenses correspondingly large, it would have been impossible for me to make the experiments which I have made during the last quarter of a century. Being located in a small town, with expenses small, and not of very great ambition, it has been my pleasure to do what most of you would perhaps not have been willing to have made the sacrifice to do. I come here to-night simply to present to you the result of some recent experiments in the same direction in which I have been here before,—not that I have anything different to present, only there are some new features which to my mind are very important. I have practiced dentistry nearly thirty-six years, and twenty-five years of that has been given up almost entirely to operations upon the teeth with a view to preserving them, not having done anything in the way of extracting teeth or furnishing artificial teeth. My practice has been of course, in a country town, very limited; but it has given me a chance to observe not only my own operations, but also those of others. I think the principle involved in this method which I am to demonstrate is the greatest boon that has ever come to dentists, or the public who employs them. I think with tin and cohesive gold you have the only means by which you can arrest decay. I believe this to be true; if I did not, I would not be here. I certainly have no disposition to foist anything upon you which I do not believe myself. It is only two years since I began to use tin in combination with gold. Of course, "one swallow does not make a summer," but any one who has had experience in operating on the teeth can judge in a very little time what the conditions are, whether they tend toward health, or whether they tend toward disease; I could tell from a filling which has been in the mouth a year whether it was likely to remain indefinitely without change, and I am satisfied that with this combination of tin and gold such a condition does exist.

The way in which tin and gold can be introduced without incorporating them is, I think, the best we have to-day. It has been a dream of mine for a long time to get a filling-material that could be easily introduced without the extreme and exhausting labor that is required for cohesive gold. I said to myself, "You must have in the first place a material that corresponds to the dentin; it must at least be amorphous. For the outside covering it must resemble the enamel, which is crystalline." How to get this combination has been a study to me. We cannot get it in one material, but we may get it in two. We have the tin, which is amorphous, structureless, which comes in contact with the dentin; and we have a covering for the tin, made of an indestructible substance that is crystalline. One day I said, "Why cannot we anneal tin the same as we anneal gold? Freshly cut block tin will unite very readily, so there must be a film that goes over it when exposed to the air. Why not anneal tin and get cohesion before it is put into the cavity?"

I am using Nos. 4 and 6 tin foil, manufactured by The S. S. White Co. Tin melts at 460°, and in annealing it you must take care not to burn it. I have been able in my office to get a union between the tin and the gold so as to contour teeth stronger than anything I have been able to do with gold alone with former methods. I so thoroughly believe in this method that I think it ought to be taught to our boys. It may be doubtful whether many of the older members of the profession would be willing to change their practice. The idea of changing from a 14-ounce lead mallet to a little delicate instrument like that I have here is so radical that I do not know whether the older members will adopt it; but I hope the younger men will have the benefit of what I believe to be a great advantage in filling teeth. Many of you are professors in some of our colleges, and I hope you will interest yourselves enough to bring this matter before the students.

Dr. Shumway then demonstrated his method.

## Incidents of Office Practice.

Dr. E. C. Kirk, of Philadelphia. I have a little matter that I would like to present to the members of this society. In looking over a collection of ancient dental prosthetic appliances in the possession of Dr. Barrett, of Buffalo, I came across a denture which struck me as being exceedingly interesting. It was made about the beginning of the present century, and, I understand, was worn by an English military officer, who evidently used it for some years. It consists of a base plate carved of hippopotamus ivory, and six of the teeth are human crowns cemented on to this plate with posts. It is a full upper and lower denture, in which the old spiral spring arrangement is used. The interesting feature is not from the prosthetic side, but from the pathological side. We are all familiar with the belief once pretty generally held and which I think is still held by some, that the disorder known as caries of the teeth is due to some morbid manifestation of the internal vital conditions of the tooth, or that internal vital action plays some part in it, and that an inflammatory condition accompanies the carious process. I found in this denture a number of cavities of decay, situated in the sulci of the masticatory teeth carved out of the hippopotamus ivory, so that the question of vitality in relation to caries in this instance is absolutely eliminated as a factor in its causation. That fact, however, needs no demonstration at this time. In addition to the manifestation of caries in the artificial denture, there was another and more important disease manifestation, that of erosion,—not of the natural teeth used as crowns, but of the ivory of the base plate. We have in this inert material a perfect example of these two diseases. I did not bring the specimen with me, as I did not feel at liberty to do so, because it is very fragile, and it was loaned to me by Dr. Barrett to be photographed; but I think the photographs will show the conditions which I have described, and I will pass them around for your inspection. The erosion is not upon the teeth at all, but is on the ivory base plate. There is some erosion at the cervical borders of the teeth, but that to which I refer is on the plate.

Dr. O. E. HILL. Is the erosion perfectly smooth and polished?

Dr. KIRK. Not as smooth as when it occurs in the enamel. I would call attention to the fact that in the view showing the palatal surface of the upper denture, there are, besides the cavities in the teeth themselves, at least three carious cavities in the base plate itself; and while the photograph does not show it distinctly, I can say that the cavities were started in little imperfections in the ivory itself, which formed a lodgment for the bacteria of decay, and they have set up the process of disintegration and formed three cavities in the palatal surface of the denture. The appearance of the cavities is exactly similar to that of the cavities in the grinding-surfaces of the teeth.

Dr. J. F. P. HODSON. Had those all the characteristics of ordinary decay,—discoloration, etc.?

Dr. KIRK. So far as a naked eye examination could determine, they were exactly similar to cavities found in normal teeth in such positions.

The PRESIDENT. I wish Dr. Kirk would state the application of this as far as it bears upon the paper read by Dr. Williams last year.

Dr. KIRK. The bearing of it is simply this: that Dr. Black and Dr. Williams take the position that the cause of caries in all cases is entirely external to the teeth,—that we cannot look upon tooth-structure or any modifications of it as a cause of caries. The cause of caries is, as shown by Miller, absolutely bacterial, and structural differences in teeth are conditions which act simply as secondary or modifying factors in the clinical phenomena of the disorder.

Dr. H. G. MARSHALL. In 1877, when at college, I dissected a skull which was said to contain a perfect set of teeth at that time. That set to-day has several cavities in it—quite large ones—which have developed since that time. Could not those cavities described by Dr. Kirk have developed since the teeth were taken out of the mouth? At the time the skull referred to was examined it was said to be perfect, but to-day not only have several of the teeth gone to pieces, but there are cavities of black decay. These cavities were not distinguishable at the time of dissection.

Dr. WM. JARVIE. Might not these cavities have developed since then by the material having become thoroughly dry, and the moisture in the material at the time it was examined filling up the cavities?

Dr. MARSHALL. That may be so, but I only spoke of it in relation to the case just mentioned by Dr. Kirk.

Dr. EDWARD C. KIRK, of Philadelphia, then addressed the society on the subject, "A Restatement of the Tooth-Bleaching Problem," an abstract of which follows:

From a general survey of existing ideas upon the question of tooth bleaching one cannot avoid the inference that our practice in this line of treatment is almost wholly empirical. Practitioners concern themselves principally with methods of procedure and the detail of minutiæ which go to make up a given bleaching process, rather than with the scientific reasons why the process is applicable, or from a rational understanding of the conditions to be met. Hence it is that we hear more of the relative merits of given processes for tooth bleaching than we do of the principles which govern their successful use. But the best and most uniformly successful results in this as in any line of treatment can never be attained through the empirical study of clinical phenomena alone; a clear understanding of the underlying principles involved is essential to a rational use of methods based upon them, and is necessary to their successful application.

It is true that our knowledge of the principles underlying tooth-bleaching processes, as well as of the conditions to be met, is meager and imperfect, and still needs thorough investigation. Yet there is enough to serve as the basis of study, and it is with the hope that I may be able to give direction to your thought in this matter that I have chosen this topic for consideration.

It is at once evident that we are confronted with a chemical problem, for in the successful application of a tooth-bleaching agent we have wrought an important change in the matter causing the discoloration, so that it has lost its color quality and become white. Any change which affects the composition of matter so that its identity as such is destroyed is a chemical change.

Our problem then is one of chemical reaction between a so-called bleaching agent and the coloring matter lodged within the dentinal tubules which shall so alter the composition of the latter as to render it colorless. A bleaching agent is any agent capable of effecting that result.

We may next consider the nature of the coloring matter, and afterward the means by which its color factor is destroyed.

Tooth-discoloration may arise from many causes, but for our purpose this evening we will consider only the most common one, —viz. that following death of the pulp and in which the source of discoloration is the hemoglobin of the blood. Hemoglobin is a complex proteid compound contained in the red blood-corpuscles. Traumatic causes, intense and sudden congestion of the pulp due to irritants, especially of arsenious acid or strangulation of the pulp, may cause a rupture of the stroma of the corpuscles, liberating their contained hemoglobin and its diffusion into the tubular structure of the dentin. The result is that the tooth becomes pink.

The difference in appearance between blood containing unruptured corpuscles and that in which the hemoglobin has been liberated is quite marked, and is clearly seen in the two flasks before you. One contains simply defibrinated blood, the other defibrinated blood which has been agitated with a small amount of ether. The latter, when viewed even in thin layers by transmitted light, presents the appearance of a homogeneous solution of hemoglobin in serum, while the former, in thin strata, presents the characteristic cloudy, granular appearance due to the presence of the unbroken corpuscles.

We may now test the reaction of our hemoglobin solution with hydrogen dioxid by staining a sheet of white blotting-paper with the hemoglobin and then applying the dioxid, and, as you see, the color is rapidly discharged, from which we infer correctly that in the very first stage of tooth-discoloration,—viz, the pink stage,—the color is readily discharged by pyrozone.

The pink stage, however, rapidly passes and gives place to a brown discoloration, or at least some modification of a brown tint, varying in intensity with the amount of hemoglobin originally present. The change from the pink to the brown tint is due to a chemical alteration in the hemoglobin, which consists of its splitting up into hematin and globulin. This change takes place more or less rapidly and spontaneously within the tooth-structure. We can bring about the same result experimentally by the application of any acid to the hemoglobin stain on our blotting-paper. and by touching the stain with dilute hydrochloric acid you see the bright red color is instantly changed into brown. Upon making an application of pyrozone as before we find that the brown stain remains unaffected, and we infer that the brown stage of tooth-discoloration is relatively more resistant of bleaching by pyrozone than is the pink, an inference supported by clinical observation. The tooth under ordinary circumstances passes through color changes beyond the brown stage into a bluish or gray or nearly black color, and these changes in color are due to the progressive breaking down of the hemoglobin until the compound is reduced to its lowest terms. The final black or dark color is permanent, and is due to the formation of an unalterable compound of iron probably with sulfur, the iron being one of the original constituents of the hemoglobin and the element to which its various color manifestations are due. The sulfur which enters into the formation of the permanent final stain is derived from the protoplasmic element of the cellular structures of the pulp.

The resistance of the brown discoloration of hematin to pyrozone and other bleaching agents in greater or less degree renders the restoration of teeth so discolored often quite difficult. I have found, however, that the brown discoloration may be successfully removed by the prolonged action of either sodium or hydrogen dioxid, followed by an application of strong oxalic acid. The rationale of the process is based upon, first, the existence of iron as a constituent of hematin, and the formation of a soluble and practically colorless salt of iron with oxalic acid.

The permanence of the bleaching process is directly related to the existence of iron as an element in the original coloring matter of the tooth, and which must either be finally gotten rid of or else so fixed by the application of certain agents that it cannot form new and colored compounds, if a permanent result is to be hoped for.

That iron is one of the elements of the hemoglobin stain is easily demonstrated, and that it is not removed by pyrozone, but simply changed into a colorless combination, will be seen by applying the usual reagents for the detection of iron to the bleached stain on the paper before you, and there are at once shown the characteristic reactions of iron to potassium sulfocyanid, potassium ferrocyanid, and to ammonium sulfid. Teeth in the early stages of discoloration and which contain coagulable matter in the tubuli should be treated to an application of strong zinc chlorid immediately after the bleaching by pyrozone, in order to coagulate and fix the white compound unalterably, or, what is better, should be treated with a strong alkali,—*e.g.*, sodium dioxid or Schreier's preparation,—with a view to dissolving and eliminating the contained organic matter, aided by a thorough irrigation by hot distilled water. Where coagulable matter is not present resort must be had to a resinous solution, applied to the desiccated tooth until the dentin is saturated as fully as possible.

### *Discussion.*

Dr. VAN WOERT. Does Dr. Kirk believe or think that the galvanic current has any additional beneficial effect in connection with any of the agents he has used? Does it make the bleaching more permanent if it has been used cataphorically?

Dr. KIRK. That opens up another phase of the subject. It depends upon your method of operating. If it is a question as between the relative value of an ethereal twenty-five per cent. solution of hydrogen dioxid, or an aqueous solution of equal strength, I see very little difference. My statement, however, needs some qualification. It depends upon another thing, too,—and that is, whether you desiccate the tooth in the beginning, or whether you do not. Where I am going to use an ethereal solution, I do not desiccate the tooth. Mr. Evans some time ago gave me the hint that hydrogen dioxid was very hygroscopic,—that it was greedy of moisture; therefore I reasoned that it would be better to not remove all the moisture from the dentin, and in that way there would be a leading in of the hydrogen dioxid by reason of its affinity for water causing it to leave its ethereal solvent and to penetrate the tubuli. On the other hand, if I am going to use an aqueous solution, I would desiccate first and then use the current. I get a better result cataphorically with aqueous pyrozone than I do without; but I cannot say I get a quicker action with the aqueous solution used cataphorically than I do with the ethereal solution used without cataphoresis. Where I need an aqueous solution, as I do in many cases, I would use the current.

Dr. JARVIE. We are always glad to have Dr. Kirk with us; he always has something interesting, and I am sure we have all enjoyed his exposition as to the cause of discolored teeth, and their treatment. Bleaching teeth is an exceedingly interesting subject to all of us. To have a patient come with an incisor discolored, yet perfect in form, and to not be able to restore the tooth to its normal color, is very trying. Twenty years ago I paid a great deal of attention to the subject of bleaching teeth, the agents I used at that time being chlorin and oxalic acid. The results were not always satisfactory, and I gave up for many years attempting to bleach teeth by chemical means, relying entirely upon cutting away the discolored dentin, and lining the cavity of such teeth with a white oxychlorid. I find that generally I get better results by that method than by any other; but there have been certain types of discoloration that I have never been able to successfully treat,—the vivid yellow, the dull gray, and the pink that the essayist has described so graphically. I should be very glad indeed to be able to restore the color of such teeth by using peroxid or any other agent that would do it without injuring the tooth-structure. However, I have not been quite satisfied with the result of the experiments as shown to us to-night. It may be because I have not thoroughly understood what has occurred. In the first place, the porous condition of blotting-paper is so very different from the dense structure of the dentin, that I think it is hardly well to show experiments with blotting-paper that are expected to be carried out on dentin. The penetrability of one is so much greater than that of the other. It is very much easier to penetrate the texture of blotting-paper than to penetrate the tubuli of teeth. Then again, as I watched the paper, it seemed to me that where the peroxid was used the color was not neutralized; it was simply driven on, and we see the same amount of color on the back as we saw before on the front, and it appears to me that there is still the same amount of red on the paper, although in a different place. If that should occur in the tooth it would not serve our purpose at all. To have the pink discoloration removed from that portion of the tubuli near the opening into the cavity of decay, and have it forced still farther in, would be just what we did not want. I am sure that Professor Kirk has not come here to show us anything of that kind. He will demonstrate that I have not understood him, and not watched closely, and I speak thus plainly for fear the result of the experiments appeared to others as it did to me, and that they as well as myself may have the benefit of the elucidation which I know we will have from Professor Kirk.

Dr. VAN WOERT. I would like to say in connection with the question I asked Professor Kirk, that in listening to gentlemen throughout the country give their experience in bleaching teeth, many diverse opinions are heard, both as to the usefulness of cataphoresis and as to its merits in connection with the different pyrozone solutions. My own experience has been that with the twenty-five per cent. pyrozone the same results are obtained without the use of the electric current as with it. It seems to me that we are working in the dark. I speak of it, that while Professor Kirk is here he can lead us to a correct understanding of the subject, and show us why the successes come, and why there are so few failures.

Dr. KIRK. I did not think it necessary in the beginning of my discourse to explain that the texture of the medium on which I endeavored to show these color reactions differed from tooth-structure, as I thought it would be taken for granted. Dr. Jarvie has taken a view of the subject which is hardly in line with the argument I have endeavored to present. His remarks have to do perhaps with the relative rapidity of diffusion of coloring matter as between blotting-paper and dentin. There was the appearance that some of the coloring matter had been driven through the back of the paper; but I ask the audience to accept as a fact that hydrogen dioxid will bleach hemoglobin, for that is exactly what occurs each time a recently discolored tooth is bleached by that substance. If it is necessary, I will demonstrate the reaction in a test tube. It is hardly necessary to argue the point that pyrozone is a bleacher; nor is it necessary to attempt to prove the point that in its use as a tooth-bleacher it does not drive the color from the surface into the interior of the tooth, because we know that we do bleach teeth with hydrogen dioxid. What I have mainly endeavored to do this evening was to demonstrate the characters of some of the various color reactions involved.

With regard to Dr. Van Woert's inquiry, I will say in the beginning that I am incapable of answering his question fully. There can be no difference between bleaching with ethereal solution, twenty-five per cent., topically applied, and that cataphorically applied, because the ether is practically a non-conductor. Wherever I use hydrogen dioxid cataphorically, it is always in aqueous solution. As to whether there is any advantage in aqueous pyrozone cataphorically used over ethereal pyrozone not used cataphorically, I am unable to say.

As to the question of the positive and negative poles, I think it has been demonstrated that the $H_2O_2$ has been carried cataphorically from the negative to the positive. Practically I know that it works that way, and I have never reversed the poles, as I have not found it necessary to do so.

Dr. VAN WOERT. Professor Kirk has told us just what I wanted to know,—that there is no advantage in using the galvanic current except in special cases. I have made that claim for some time. I have stated to gentlemen here and to students in colleges that I was sure there was no advantage in the cataphoric apparatus for bleaching teeth by pyrozone, and I wanted Dr. Kirk to bear me out, as he has done in the last statement.

Dr. KIRK. This device that I spoke of for getting rid of the iron oxid stain by the action of hydrogen dioxid plus oxalic acid, would be useless with an ethereal solution, as water is necessary to carry the oxalic acid into the territory which is already flooded with hydrogen dioxid. The oxalic acid would not be soluble in ether to a sufficient degree.

Dr. M. L. RHEIN. I might add a word as to my experience in regard to this question that Dr. Van Woert brings up. I agree with Dr. Kirk's view that where the ethereal solution can be used, the current is of no particular value. I have been very well satisfied in bleaching to seal a pellet of cotton in the tooth, saturated with the ethereal solution. I agree thoroughly with the statement that where the ethereal solution is used there is no advantage to be gained with the current; but there is very great value in the cataphoric application where we are compelled to use an aqueous solution.

In reference to the point that Professor Kirk brought out as to the removal as far as possible, before bleaching, of the by-products, so as to avoid any recurrence of the condition, I would say that I have been very successful in that respect with the use of the sodium-potassium preparation introduced by Dr. Schreier, of Vienna. I think its advantage in clearing out the tubuli of the dentin has never been fully estimated by the profession,—leaving the tooth in such condition that very little of those products remain that would tend to discoloration after the dentin had been once bleached.

Dr. HILL. I would like to ask Dr. Kirk how long it ought ordinarily to take, or rather how far into the tooth within any given time, will those chemicals penetrate and destroy color, and thereby bleach the tooth?

Dr. J. BOND LITTIG. What is the distinguishing characteristic in a tooth to be bleached, indicating the use of the ethereal solution or of the aqueous?

Dr. KIRK. With regard to Dr. Hill's question, I can only give a very general answer, and that is to say that where a tooth is going to bleach at all, it ought to bleach in half an hour, at a fair average. Of course, that would be modified by circumstances,—the amount of discoloration, whether it had received a treatment of carbolic acid before it was treated with a diffusible bleaching substance, and some other features; but the case that I mentioned, which yielded finally to the treatment of pyrozone and oxalic acid, had received repeated treatments for about two weeks. The men had worked at it very conscientiously—perhaps an hour at each sitting—and we came to the conclusion that it had reached a point where the color would not move. The final bleaching was over inside of thirty minutes, and it was bleached whiter than the adjoining teeth by the pyrozone and oxalic acid.

Dr. Littig's question I am unable to answer, except to say that I would try the one, and if that failed, I would try the other. If we knew absolutely in advance the nature of the pigment that is the cause of the discoloration, we could at once select the process by which best to bleach it; but as it is we can only tell in a general way. We know if the pulp has been devitalized by traumatism, and there has been no exposure, that we can exclude such treatment as we would use where chemicals had been previously used. We must treat by exclusion,—by trying one, and if that fails, by trying another. To get rid of this iron stain, or where putrefaction has taken place, there are two methods to use, one by chlorin, or, as I just said, by applying hydrogen dioxid, converting it into an oxid, and then using oxalic acid.

Dr. HILL. I want to give my experience with a tooth of which I once spoke before this society,—the patient a lady probably forty years of age, and the tooth a lower lateral incisor. She has come to me twice, the first time about two years ago, with that tooth very red and sore to the touch, no other indications about it. I did nothing to it, and told her to watch it carefully, and come in the next day. The next day it was a little lighter, and in the course of a week the redness was gone. In about a year the same conditions recurred. She was in my office within two weeks, and the tooth was not discolored in the least. That is twice that I have seen that tooth in that condition. I believe the tooth is still alive.

Dr. KIRK. I have seen a very similar case.

The PRESIDENT. One phase of this matter has not been discussed. I wish Dr. Kirk or any other gentleman would say a word more in reference to the method of fixing this beautiful color after it is once attained.

Dr. KIRK. I have used the resin varnishes, that is, copal or hard balsam dissolved in chloroform, or with greater satisfaction a material known as "Kristaline." It is one of those celluloid lacquers that are popular now for covering silver-plated and brass ware to prevent tarnish. It makes a most excellent cavity lining. Paraffin dissolved in ether is also very good.

Mr. GANE. I do not know that I can add anything to this discussion. Dr. Kirk's paper is one of the most lucid and most practical papers on the subject of bleaching teeth to which I have ever listened. It clears up several points which have been in dispute for some time as to the exact cause of the various forms of discoloration in the tooth-structure, and enables us in a very simple manner to overcome difficulties which some of those who have used pyrozone for bleaching have met with. The use of oxalic acid or any acid in conjunction with pyrozone should prove extremely useful, possibly in removing certain forms of stains which hitherto have been so persistent. It is possible that we may be able to remove those stains entirely in the future in this manner. That of course means a great deal of experimental work, and, so far as I know, up to the present, it has not been carried to any conclusion. The reactions on blotting-paper I think were extremely interesting, particularly the brown stains. That has been a matter of great difficulty with me, and I am glad that Dr. Kirk has at last found a method by which this can be done, and I must congratulate him on his work.

Dr. MILLER. I know very little about this matter, and can only say that we made a somewhat analogous series of investigations once to see how we could get rid of freckles on the skin. I can say nothing about the teeth, but the method that Professor Kirk has given us with reference to the brown stain I think in all probability would apply to the removal of freckles and brown stains on the skin. I am pleased to say that I have picked up something that has enlightened me.

Mr. GANE. A dentist once said to me that after bleaching teeth he had considerable difficulty in making his fillings stay in the teeth. He said it was not through any fault in his work, but that on several occasions these fillings had come out, and he wanted to know if I could explain why they did so. The only explanation I could give was that it might have been due to the action of the chlorin on the tooth-structure. I would like to ask if Dr. Kirk thinks that possible.

Dr. KIRK. I should imagine it was the fault of the filling-operation, not of the bleaching process at all. I cannot conceive it possible that after bleaching the tooth an operator should leave sufficient calcium chlorid in the tooth to make it hygroscopic. If he were at all conversant with the chlorin process, he would know that it was necessary to wash the tooth-structure entirely free from the by-products.

The PRESIDENT. This has been one of the most interesting evenings of the season, and the clinic this afternoon was one of the best that has ever been given before this society. It is fitting in an eminent degree that a vote of thanks be given, not as a formal expression, but as an expression right from the hearts of the members of the New York Odontological Society.

Adjournment.

W. J. TURNER, M.D., D.D.S.,
*Editor New York Odontological Society.*

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## FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting Tuesday evening, March 8, 1898, at the New York Academy of Medicine, No. 17 West Forty-third street; the president, Dr. Alfred R. Starr, in the chair.

### INCIDENTS OF OFFICE PRACTICE.

Dr. H. D. HATCH. I had a case come to me recently which might be of interest. It is the case of a young lady twenty-two years of age, a school-teacher by occupation, and so far as I could observe, a well-developed young person,—no evidence of degeneration that I could see. She still retains seven of the temporary molars, only one of the bicuspids having erupted. The superior laterals are suppressed, and the third molars have not yet erupted. There are no signs of the others coming, and with one exception they are firm and in good condition.

Dr. JOHN I. HART. Dr. Schreier says the micro-organism of alveolar abscess is identical with the diplococcus of pneumonia. About two weeks ago a patient of mine called, who is the fortunate possessor of excellent teeth. He has a very small filling at the cervical border of a second upper bicuspid; the tooth was somewhat elongated and gave evidence of acute alveolar abscess, without the fistulous opening. I made tests with the lamp and otherwise, and determined to open the tooth. I gave it the usual treatment, and at the end of ten days the tooth had a temporary but tight filling in the root-canal, and was sealed at the vent opening. At the time of the appointment for the permanent filling I received word from the wife of the patient that he was suffering with pneumonia. Naturally we will say that so many of our patients suffer with alveolar abscesses, and so few eventuate with pneumonia, that it is not worth consideration; but having read Dr. Schreier's article so recently, I thought there might be something in it, and that we might watch and see if any other cases eventuated in this way.

Dr. S. L. GOLDSMITH. I had something occur the other day which was rather peculiar. I applied arsenic to a case, and in trying to take out the pulp I found considerable life. As I had already entered the pulp, I thought it wise to use cocain cataphoresis. After I had applied the cataphoric current for twenty-five minutes or more, I found more life than before. This circumstance set me to wondering whether possibly I had electrified the pulp into life again.

Dr. HART. Were there pulp-stones there?

Dr. GOLDSMITH. No, sir.

Dr. S. FREEMAN. I think it reasonable to assume that a portion of arsenic remained in the tooth which, upon application of the electric current, penetrated the pulp and caused inflammation, and therefore when the doctor attempted to remove the pulp he found it more sensitive than before the use of cataphoresis.

Dr. Talbot not being present, the secretary read his paper, entitled, "Degeneracy in its Relation to Deformities of the Jaws and Irregularities of the Teeth."*

There being no discussion, a vote of thanks was moved by Dr. Goldsmith to the essayist for his excellent paper. Carried unanimously.

Adjourned.

B. C. NASH, *Secretary.*

At the thirtieth annual meeting of the First District Dental Society of the State of New York, held April 14, 1898, the following officers were elected for the ensuing year: Alfred R. Starr, president; William C. Deane, vice-president; Benj. C. Nash, secretary; James W. Taylor, treasurer; John H. Meyer, librarian. The standing committees appointed are as follows: Executive Committee—John I. Hart, Chas. A. Dubois, William Carr, chairman, 35 West Forty-sixth street. Clinic Committee—J. Fournier, John C. Nisley, Arthur L. Swift, chairman, 161 West Seventy-first street.

B. C. NASH, *Secretary.*

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*For the paper in full, see page 734 of the current number.

# AMERICAN MEDICAL ASSOCIATION—SECTION ON STOMATOLOGY.

(Continued from page 662.)

## FIRST DAY—*Afternoon Session* (Continued).

DR. G. T. CARPENTER, of Chicago, read a paper, an abstract of which follows:

### A METHOD OF HANDLING ALVEOLAR PYORRHEA.

In presenting this paper before this Section, I do so with a feeling that the practical side should not be lost sight of while we are eagerly searching out the scientific. Much has been written on the subject of pyorrhea alveolaris, and there is a great difference of opinion still existing as to the etiology, pathology, diagnosis, and treatment of this disease. It is not my purpose in this paper to discuss the various points above mentioned, but to give a brief outline or method of handling these cases which has given me the most satisfactory results. It has been my experience that different cases of pyorrhea need different treatment. One case may yield readily to a certain treatment, while another may be very persistent in its pathological behavior. But thoroughness in diagnosis and treatment is the key to success. In diagnosing any case, get a history of it and decide on the predisposing cause, or cause outside the pocket, which is generally from local irritation caused by wooden toothpicks, ligatures, wedging of teeth, ill-fitting plates or crowns, accompanied with neglect of the mouth. These or other causes should be removed and any constitutional predisposition should be corrected, and then we should secure the hearty cooperation of the patient. The disease once established is self-sustaining, and it is within the pocket that we must look for, find, and remove the exciting cause, which may be serumal deposits, pus-secreting membrane, foreign substances, or diseased or necrosed margins of process. To make a careful and thorough examination of the pockets I secure dryness with bibulous paper, protect the parts with a napkin, and coat the surrounding gum with cosmoline to protect the parts outside of the pocket from the action of medicines. Now dry the pocket and pack with cotton, slightly moistened with four to eight per cent. aqueous solution of cocain. After allowing this to remain several minutes, carefully remove the cotton. The pocket will be found to remain open, so that an examination can be made with a mouth-mirror. Deposits, if present, can be located before instruments are used for their removal. I operate on but one tooth at a time, or on the interproximal space between two teeth, doing all that I intend to do in that immediate locality before directing my attention to other teeth. All loose teeth having lost two-thirds or more of their natural support are extracted. The best instruments to use in the pockets are spoon-shaped excavators, with the shanks bent so as to reach every part of the root or pocket. They must be kept sharp, so that deposits can be easily removed and the root curetted. The soft parts and margin of process can also be curetted if necessary. The pocket should be cleansed with equal parts of peroxid of hydrogen and pasteurine, or three per cent. pyrozone and borolyptol, using a flat-pointed syringe, which should pass to the bottom of the pocket. This will not only antiseptically cleanse, but mechanically carry out all free and loosened particles. The gums are now wiped dry and painted with a tincture of iodin, which should be repeated about twice a week.*

The tooth, if loose, is supported by bands or ligatures, and if moved by occlusion I grind the tooth or its antagonist sufficiently to prevent all movement, so as to procure rest for the affected parts. All subsequent treatment of the pocket should be made by the use of a thinly-shaved hard wood toothpick, which can be moistened in the antiseptic and bent so as to reach any location. This should be passed into the pocket as deeply as possible without injury to the tissue or causing pain or hemorrhage, and the application repeated once or twice a week as long as the toothpick can gain entrance to the pocket. I find that it is seldom if ever necessary to make incisions through the gums into the pockets, and I but seldom resort to the use of dilute or stronger acids as an aid in softening or removing deposits or to establish resolution.

Antiseptic and prophylactic conditions should be established and followed during treatment, and indefinitely continued throughout life. I recommend a thorough rinsing of the mouth and the use of an antiseptic after each meal. I also recommend a medium stiff tooth-brush to be carefully used once in twenty-four hours, and that at night before retiring. This time, once established, will not be substituted for other hours in the day. The brush will have time to dry and for the elasticity of the bristles to be restored, which will do the best work at the most needed time. A good dentifrice with the base precipitated chalk should be used on the brush, after which one drachm of pasteurine or borolyptol should be taken into the mouth and retained for from three to five minutes, at the same time moving the cheeks and lips so as to force it between the teeth and reach all parts of the mouth; then expectorate and retire without rinsing the mouth with water.

The time spent in the successful treatment of this disease depends on the constitutional condition of the patient and the extent of the disease, or the thoroughness with which the first operation is performed. The recurrence of the disease comes from a failure to remove the predisposing causes. The reproduction of gum-tissue† in all interproximal spaces is essential to prevent the lodgment of food or injudicious use of the toothpick. I believe that a thorough removal of the cause, with antiseptic treatment and stimulation of the gum-tissue, will cure the most persistent case of alveolar pyorrhea.

### *Discussion.*

Dr. J. H. PARSONS, Boulder, Col., asked Dr. Carpenter if he recommended the use of a toothpick, and what kind.

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*Dr. Talbot's article on Pyorrhea Alveolaris, in the *International Dental Journal*, April, 1896.

†"Reproduction of Gum-Tissue." *Dental Review*, November, 1897.

Dr. CARPENTER said that he used the wooden toothpick in treating pyorrhea to carry the antiseptic into the pocket, but did not recommend it to keep the teeth clean, but recommended a quill toothpick only for that use. The objection to the wooden toothpick was that it was liable to break and remain between the teeth or penetrate the gums.

Dr. A. E. BARKER, Idaho Springs, Col., asked if there was not danger of injuring the peridental membrane when using sharp excavators in clearing out the pockets.

Dr. CARPENTER said no. His practice was to carefully remove every particle of the deposit by curetting both hard and soft surfaces, so as to establish a fresh form of inflammation.

Dr. W. K. SINTON, Colorado Springs, asked if there was any objection to the use of a thin steel spatula for introducing peroxid of hydrogen into the pocket.

Dr. CARPENTER said the peroxid would act upon the steel.

Dr. J. TAFT, Cincinnati, said the paper speaks of the importance of a correct diagnosis and a full history of the case. Does this mean to learn the present condition of the locality attacked and the steps through which it has passed; whether the condition is acute or chronic; whether it has involved the surrounding tissues, as it sometimes does? All of this and more is required for a full understanding of any case, and with less thorough knowledge treatment is only empirical. There are many variations in pyorrhea; there is usually a pocket which is an opening between the tooth and surrounding tissue, from which there is a flow of pus sometimes very offensive, at other times not. The pus sometimes is very poisonous to surrounding tissue, sometimes not. There is usually considerable deposit in the teeth, sometimes little or none. All these various conditions must be known, and yet a much wider knowledge is needed to treat intelligently. The habit of the system as to yielding to or resisting disease, and the predisposition to certain diseases, should be learned, and the susceptibility of the patient to the action of remedies. All of this knowledge is necessary to a correct diagnosis of any case, and to this should, if possible, be added a more or less complete knowledge of the parents and grandparents.

Who goes on without all this knowledge will often find that failure will attend his treatment. We often hear the treatment of pyorrhea alveolaris discussed as though the disease was a simple local matter. Systemic treatment based upon a thorough knowledge of the principles that govern disease, and a particular knowledge of the individual, are essential.

Dr. J. N. CHIPLEY, Pueblo, Col., asked why Dr. Carpenter objected to the use of acid to soften the deposit in pyorrhea.

Dr. CARPENTER said he would answer this in closing the discussion.

Dr. W. T. CHAMBERS, Denver, asked whether Dr. Carpenter considered the cause of the disease was local. Many claim that it is constitutional, others that it is local, and some that it may be both. Until this is settled we cannot be sure of the course of treatment we should pursue. In the treatment of his cases he uses peroxid of hydrogen, and then washes out the pocket with water as hot as the patient will stand it. In case the removal of deposit causes too much pain he uses cocain syringed into the pocket; if this fails to produce anesthesia he injects it into the tissues. When he feels that the deposit is all dislodged from the tooth he washes it out of the pocket with hot water, getting the syringe clear to the bottom of the pocket. He then treats the pocket with lactic acid, protecting the tissue around the tooth from the action of the acid by the application of glycerol. This is all of his treatment. If the disease does not appear cured he concludes that the deposit was not all removed, and he goes over it all again.

Dr. J. M. NORMAN, Denver, said pyorrhea was one of the most difficult conditions which we are called upon to treat; a most thorough history of the case is very important. When the cause is known a great majority of these cases may be successfully treated.

Dr. TAFT said when the history of a case has been learned, then the next thing is to determine how to remedy the conditions. There are two general lines of treatment, the surgical and the medical. The surgical treatment consists in the thorough removal of all deposits about the teeth. This must be done with instruments so designed that they will easily reach every part of the root of the tooth to be operated on. Further surgical treatment is to remove any necrotic tissue from the lining of the sockets of the teeth. This will take away any half-dead tissue, invite a flow of fresh blood to the part, and remove the sluggish blood and provide a stimulus, which will cause healthy granulation to begin. The flow of pus indicates various conditions, according to the quality of the pus, but in any case the removal of all dead or half-dead tissue is indicated.

The use of hot water to wash out the pocket has been spoken of. This will loosen up and remove any *débris* there, and also will sometimes detach the dead tissue. It may do this to such an extent as to free the locality of such matter, and thus allow the closing up of the pocket. If used with an antiseptic material it should give good results. When we introduce any treatment we should know why we do a thing, and what result we can reasonably expect. Therapeutic treatment is advisable; escharotics may be used to separate the dead parts from the living so reparation may be brought about. He had been using the lactate of silver with some satisfaction,—its good results are from its antiseptic qualities,—but he had not used it long enough to be sure that it would accomplish the desired result better than other preparations. Carbolic acid is used largely, and he thought in nine cases out of ten by those who have no conception whatever of how it will act. Tonic treatment of the system is necessary in many cases of pyorrhea.

Dr. J. S. MARSHALL, Chicago, spoke of the advisability of knowing whether the patient was subject to rheumatic conditions or whether there is a family history of gout. Often in cases of true pyorrhea no deposits will be found on the teeth at all. This upsets his theory of the connection of pyorrhea with rheumatism, etc. In 1886, at Minneapolis, he had reported two cases of pyorrhea without deposits on the roots. Upon further investigation it was learned that both of these women had been troubled with what are termed female difficulties; that is, bearing-down pains, backache, etc. They were advised to go to their physician, and were treated, one for anteversion of the womb, the other for prolapsus. Proper treatment for these troubles resulted in cure in both cases, and the cure of the pyorrheal trouble followed without special or local treatment. It is quite evident that the pyorrhea in these cases did not arise from local cause, as the curing of the uterine disturbance in both cases resulted in the disappearance of the pyorrhea. He had seen cases of Bright's disease and of diabetes where there was pyorrhea; in such cases the pyorrhea cannot be cured, but only alleviated at the best. Nor can we cure when there is gout or rheumatism. We can improve the condition temporarily, but it will recur. He spoke of one patient of his, a man in prosperous circumstances, fond of big game dinners with champagne, etc., who is subject to return of pyorrhea whenever he indulges himself to excess in the pleasures of the table. These incidents show the importance of a full knowledge of the history of cases.

In the paper the essayist speaks of a pus-secreting membrane. There is no such thing. When pus is found it means that the membrane is dead, and nature is endeavoring to build up the dead membrane by surrounding it with leucocytes. The surgical rule is when there is pus in a cavity it must be evacuated, and the only way he could see to do this is to slit the cavity to the bottom and remove all deposits and leave the surface clean. Then if you wash it out with water and a solution of iodin in beechwood creasote, you will have done all that is necessary.

Dr. Taft asked Dr. Marshall, in a case of acute pyorrhea, where the alveolar wall had not been dissolved away, would he remove the wall clear to the depth of the cavity for the sake of drainage.

Dr. Marshall said he had never seen a case where the membrane had not already been removed and destroyed by the disease. In answer to another questioner, Dr. Marshall said in typical pyorrhea the cause was never purely local, but always systemic.

Dr. Taft said it did not seem to him to be true that the socket was dissolved away by the disease.

Dr. Marshall said that the point Dr. Taft made was one on which they would differ. Dr. Taft holds that the cause of the deposit was the formation of pus, while Dr. Marshall holds that the irritation arising from the presence of the deposit causes the formation of the pus.

Dr. Baldwin said it would be well if some one would furnish the profession with a very technical definition of the term pyorrhea alveolaris. When we have a case of this disease we find a state of irritation and a flow of pus; we remove the cause of the irritation and the flow of pus ceases, and we consider the disease cured. In other cases death of the pericementum has occurred. When the flow of pus is stopped, does that cure the disease without restoration of the parts?

Dr. W. G. A. Bonwill, Philadelphia, said that for the last fifteen or twenty years every one has been talking of what he can do with pyorrhea alveolaris. He thought that demonstration in practice was much better than talk. The essayist says he treats with success, and yet we learn from the paper that treatment continues through life. This is not success.

In his own practice, that is, those patients whose teeth have been under his care from childhood up, Dr. Bonwill had never had a single case of pyorrhea alveolaris. When a case comes to him he treats it thoroughly as he would any other surgical case, and does not have to plunge an instrument into it every week or two afterward. He finds usually three-fourths of the necessary treatment is to get a thorough articulation of the teeth. After this is accomplished he treats as rapidly as possible all the teeth of the upper jaw, and a day or so afterward all the teeth in the lower jaw, and lets the case go for two weeks; but first he uses pure carbolic acid in treating the sockets, and burns them out as thoroughly as if he was treating a fistula with no teeth there. After two weeks, upon examination, he will perhaps find a little superabundant gum, which he cuts off. He makes no constitutional treatment. If a patient of his has dyspepsia, he endeavors to teach him how to live so as to cure it. To have healthy teeth they must be used on hard food, such as hardtack or brown bread. After he has cleansed the teeth, articulated properly, and taught the patient how to live a healthy life, he examines the teeth that have been filled. If he finds fillings that are not properly supporting the teeth, or that let the food press down upon the gums, or if he finds gold crowns or bridges that never fit, he removes all the fillings and places in pink gutta-percha in such a way that the teeth will be bound together and supported, and that will allow the alveolar process to come to the necks of the teeth. Then the whole tissue will become healthy. He removes all faulty fillings and puts in amalgam throughout the whole mouth. In some cases there are teeth which cannot be saved; these he extracts and puts in a proper plate that will clamp the teeth and support the arch. Thus the whole condition is corrected. His patients go to him every three or six months for examination and treatment, and thus have their teeth kept in good condition.

Dr. Carpenter, closing the discussion, said the reason he did not use an acid to soften the deposit was because he considered to have it softened was an injury rather than a help, as being soft it would be more liable to be left in the pocket than if it was hard. He did not think pyorrhea was a constitutional disease in any case, but that it was often aggravated by constitutional conditions, and that it could not be cured till the constitutional conditions were relieved and the tone of the system raised. He was led to experiment with specially shaped instruments, because he had found it impossible to reach all the deposits in about one-third of the cases with Allport's instruments. He tested the efficacy of his instruments by trying them on teeth outside of the mouth, first surrounding the tooth with a piece of rubber tubing to represent the pyorrheal pocket. He then bent the shanks of spoon-shaped excavators so that with them he could reach that part of the tooth that was inaccessible to the other instrument. Spoon-shaped instruments are superior to all others, because of the absence of corners that could wound the surrounding parts. He showed by a pair of casts, with teeth inserted in rubber tubing and rubber bands to represent the cheeks, how difficult it is to reach certain points on the teeth with instruments.

The subject was passed, and the Section adjourned till next day.

(To be continued.)

## DENTAL SOCIETY OF THE STATE OF NEW YORK.

(Continued from page 675.)

DR. M. W. FOSTER, of Baltimore, read his paper, entitled, "The Toxic Effect of Cocain, induced through Cataphoresis, applied to a Pulp preparatory to its Removal."*

### *Discussion.*

Dr. W. JARVIE. I am exceedingly sorry that I should have been called upon to open the discussion on this paper, because it is a subject with which I am but slightly familiar by practical experience. I have used cocain very little in my practice. Soon after it was introduced as a local anesthetic I was very much interested in it, being an intimate friend of the gentleman who first used it in this country, and hearing of it continually from him; but I had friends in New York who used it constantly, and the results of their experiments were such as to make me very cautious in regard to its use. That cautiousness has continued, and as I learn more of the drug I am inclined to use it less. I do not think a drug ought to be avoided simply because of its dangerous qualities under improper conditions. The most potent poisons that we know of are the most frequently used in medicine. Improperly used they are death-dealing; used with discretion they are the most valuable healing agents we have. It may be so with cocain, but so far there are dangerous qualities in certain cases that we do not know perfectly how to control. The case that has been cited by the essayist is one of those cases. A very small amount of cocain must have been introduced into the system, and yet very dangerous results followed. Cocain has a greater range of effect upon different idiosyncrasies than almost any drug we know of. Twenty-two grains of it have been administered before producing a fatal effect,—that, I believe, being the largest known dose that has been given,—and yet eight drops of a four per cent. solution caused death in another case, so you see the enormous range in the dose. What I have to say is not so much as to the practical use of it in cataphoresis, as to call your attention to the dangers of its use, and the necessity of being prepared to meet unpleasant results. There is a tendency among the dental profession to use cocain and other local anesthetics more and more, and there is a growing tendency among the community to avoid pain, if it can possibly be avoided. You have all had the same experience that I have had, of patient after patient coming in and asking you to use cocain for this, that, or the other thing. I think the essayist has put before us so plainly the effect of the drug and the restoratives to be used that it is unnecessary to say any more in reference to it. In cocain poisoning the respiratory organs fail first. The heart will often be found pulsating when breathing has stopped. Under those circumstances what is needed is not a heart stimulant, but something to stimulate the respiratory organs. Artificial respiration and amyl nitrite have been spoken of. Anything that will stimulate quickly and promptly the respiratory organs should be used. Why use cocain at all, when we have drugs which are perfectly harmless, quite simple of application, and that will produce the same results? You cannot know whether the patient who comes to your chair is the one that it requires but eight drops of a four per cent. solution to kill or not; so why take the risk when it is not necessary?

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*For the paper in full, see page 739 of the current number.

Dr. W. C. Barrett. The data as given in the paper are not quite sufficient. We know that cocain is a narcotic poison, and if a person is poisoned by cocain it must demonstrate its narcotic qualities. I am inclined to think, although I only use it slightly, that it is sinned against as well as sinning. I want to ask Professor Foster if there was any mydriasis; was there dilatation of the pupil of the eye?

Dr. Foster. I was not present during the application, but I understood from the physician who saw the case probably an hour afterward that there was slight dilatation.

Dr. Barrett. Was there any stertorous breathing? Was there deep narcosis?

Dr. Foster. No; she was perfectly conscious, except for the minute when she was taken from the chair. I was not there. These questions were directed to the patient afterward.

Dr. Barrett. There never was a case of narcotic poisoning from the use of cocain unless those symptoms were present. It is about the most powerful mydriatic we have, and is used nowadays almost exclusively by oculists. Cocain belongs with the opiates, and is classed with opium. How there could have been cocain poisoning in the absence of certain other symptoms which were not observed I do not know. I think there has been many a case of poisoning attributed to cocain with which that drug had nothing to do. One case came under my observation. A man was supposed to have died in three minutes from the administration of cocain. Cocain never killed a person in three minutes, nor in thirty minutes. It must pass through the same stages as opium, because it belongs to the same class. In this case it was afterward proved in the course of the medical trial which took place that the man had an organic trouble of the heart, and the final autopsy which was made showed that death resulted from paralysis of the heart, and that cocain probably had nothing to do with it. Now, I am not pleading for cocain. I believe it is the most treacherous drug with which we have to deal, and I am exceedingly cautious with it. Cocain being a narcotic poison, and acting as a narcotic poison if it acts toxically at all, it must produce narcosis of some kind, and there must be the dilatation or mydriatic condition of the eyeball. Essential data seem to be missing in this report. Of course Professor Foster was not present at the time, or he would have noticed these things. Personally I detest cocain, and I use it as little as possible. I asked a noted surgeon with whom I am acquainted, who formerly used it more than he does now, "Do you not get cocain poisoning?" He answered, "Yes." "How often?" I asked him. He said, "Altogether too often; but I combat it the same as I would any other narcotic poison, and I have had no fatal result. Yet I look for some case in which there is an idiosyncratic condition in which it will be impossible to recover the patient." As he said, and as I believe myself, it is very apt to affect persons idiosyncratically. One person may tolerate twenty-two grains, and another but the twenty-second part of a grain. I am inclined to think, from what I can learn of the case reported, that there must have been something beside cocain poisoning,—probably some organic trouble in the patient.

Dr. W. A. White. In the use of local anesthetics we cannot be too careful. The case Professor Foster mentioned called my attention to a case which came under my observation about two months ago. A gentleman called upon me and asked if I would use a local anesthetic to extract some teeth for his wife. I said I would not. He said she would not have it done without the anesthetic, and he went to a neighboring town to have it done. She was a lady about thirty-two years old, and had never been ill before. After the administration of the anesthetic and the extraction of the teeth she was seized with paralysis, and about five days afterward she was dead.

Dr. F. W. Low. I would like to ask Dr. Foster one or two questions. I understand that they used a thirty per cent. solution. Does Dr. Foster know anything about the resistance between this patient and the cataphoric application?

Dr. Foster. I understand there was the ordinary battery that is made for the purpose,—the 25-cell chlorid of silver battery. I did not see this, so I cannot say. Dr. Gillett was the instructor who came there, and it was used exactly as he uses it.

Dr. Low. We have no record as to what amperage was really in use here. I find by careful experiment that one-fifth of a milliampere of current induced for ten minutes will decompose 1-375 of a grain of the hydrochlorate of cocain. How much of that is absorbed into the tissue of pulp and tooth cannot be told, but you only decompose 1-375. I do not think you can pass a current of electricity, however slight, through cocain, but that some decomposition takes place. I do not think the hydrochlorate of cocain penetrates the tissue *as hydrochlorate of cocain*. Dr. Foster said there were two applications. Was there any hemorrhage subsequent to the first application and prior to the second?

Dr. FOSTER. There was no hemorrhage apparent in either application; the cotton became dry on the first application, and it was necessary to reinsert it, because of the lack of the cocain on it. There is the possibility, if any wounding of the pulp occurred, that it might be absorbed into the system, and then, of course, the slightest amount of cocain might cause toxic effects. I would like to ask if hysteria is not one of the symptoms or result of the absorption of cocain into the general circulation.

Dr. BARRETT. Not necessarily.

Dr. LOW. This, to me, looks like a case of hysteria. I think even if there had been no cocain used, if the wedge had been driven in as some of the students drive them in, the woman might have had a nice case of hysteria.

Dr. OTTOLENGUI. Has Dr. Low ever known a partial paralysis to be produced by an electric current without cocain by the electricity itself? It is very easy to say these things, but hysteria, from the very derivation of the word, is an affection peculiar to the female; so when you get these symptoms in the male sex it cannot be true hysteria. I have a patient upon whom I used cocain cataphorically, using one-fifth of one milliampere for eighteen minutes and producing paralysis of all that portion of the body through which the current passed from one electrode to the other, causing a numbness and chilliness for exactly eighteen minutes. Precisely the same length of time was required for the recovery as had been occupied in the application. That gentleman was not a woman, did not become hysterical or excited, and was not narcotized. I consider that a case of cocain toxemia under cataphoresis. I think Dr. Barrett is mistaken when he says narcosis must result. Dr. Mattison, of Brooklyn, who had a sanitarium for the treatment of *habitués* of opium and morphin and cocain, has collected data on this subject, and has published a pamphlet with from three to four hundred cases, giving the exact history of the toxic effects of cocain, and you will find that narcosis is not a requisite symptom. The commonest symptom is paralysis or rigidity of the muscular tissues, and in women excitability, anxiety, and sometimes aphrodisial emotions, with other conditions which simulate hysteria. But what of it? If cocain administered to a patient will bring on a bad attack of hysteria, you would do well to avoid it. It would not be any gratification to you to say that it is not cocain poisoning,—that it is hysteria. So long as it is caused by the cocain, you have to deal with it, and it is not pleasant to deal with.

Another experience of mine was that of an elderly woman who was very far from being narcotized, but she suffered from a tendency toward paralysis of the extremities, and it required three or four hours under the constant attendance of a physician for her to recover. In the case of the young man, it is of interest to report that I subsequently used cocain cataphorically upon the young man's mother, with the result that she suffered from a numbness of the tissues of the mouth and tongue and of the extremities for several hours, showing that in that particular family there was an idiosyncratic tendency against cocain. This paper is an important warning to us to be careful how we use cocain, and not to feel that we are perfectly safe because we are introducing it with electricity.

Dr. RHEIN. Where did you make that application?

Dr. OTTOLENGUI. In a living tooth, without any pulp exposure, thoroughly insulated. The cavity was in the coronal surface of a lower molar. In one of the hospitals in Philadelphia, in an operation for the removal of the tonsils, a four per cent. solution was used, merely swabbed on cotton, and the patient was in a narcotic condition for several hours, requiring the electric battery to restore him. The operation was postponed, and on the third day he was put on the table again, a two per cent. solution applied to the fauces, and he was buried the next day.

Dr. RHEIN. The question of the idiosyncrasy of certain people to the toxic effect of cocain is not the subject under discussion. We all know that a certain class of people are unable to stand any amount of cocain without showing toxic effects. In regard to this case presented by Professor Foster, I cannot agree that if there was any toxic effect from the cocain it was necessarily obtained through its application to the pulp.

Dr. FOSTER. I said with the aid of the cataphoric principle or current.

Dr. RHEIN. If Professor Foster had presented this case to us as one of his own observation at first hand, it would be possible for us to form a more accurate opinion than we can at the present time. I have been using cocain for at least thirteen years, and I have seen a great many toxic results from the effects of it. I am pretty fairly acquainted with the manner in which it affects certain people who have an idiosyncrasy in that respect, but I question very seriously the possibility of any cataphoric application of cocain to an exposed pulp being carried through the circulation in the space of time he has outlined. We find that the cavity leading to the pulp was high above the gingival border of the tooth,—one of the most difficult places to apply cataphoresis so as to avoid the possibility of leakage through the gums and into the soft tissue. No one would deny for a moment the possibility of toxic effect of cocain applied cataphorically to the soft tissue, and its rapid diffusion through the circulation in that way. The fact that the pellet of cotton became dry in a few seconds is conclusive evidence to my mind that instead of the application being directed through the pulp, it was one of those cases of faulty insulation where the current passed directly into the soft tissue, and was diffused through the system in that way. Unfortunately, Professor Foster did not see the case when it was under operation, and it is impossible for us to know how the application was made. Every one who has had experience in the use of cataphoresis about teeth knows how difficult it is to prevent leakage of the current in this particular position. It is inconceivable to me that in such a short space of time such a quantity of current could have passed through the pulp and through the apical region and caused such effects, while it is easy to see how, if the current passed into the gum, such a condition might take place in such a short space of time. Too great care cannot be taken in the use of any of the cocain salts, but in such a space of time as that I think it an utter impossibility, with a perfect insulation, for toxic effects to occur through the tooth itself.

Dr. GOLDSMITH. Is Dr. Foster aware of the amperage used?

Dr. FOSTER. No, I do not know.

Dr. LOW. Had they no machine by which they could tell?

Dr. FOSTER. The machine which was used is made in Baltimore, and there is a perfect milammeter attached to it.

Dr. VAN WOERT. From my long and varied experience in the use of cocain cataphorically, I think the impression created by Dr. Foster would be rather misleading. I fear that in the minds of some younger members it would leave an impression that they would be afraid to use cocain in that way, and I want to reiterate what Dr. Low and Dr. Rhein have said. It is necessary to know the flow of current that was passing to see whether the cocain was absorbed through the soft tissue or through the tooth. If there were toxic effects from the cocain, I think they were due to a leak, and it was taken through the soft tissues, and probably some got into the stomach. The talks and demonstrations that have been given, and the attitude of some of the younger members, lead me to believe that a large per cent. of those making use of cataphoric machines are not familiar enough with it to get the best results. It is for that very reason that data when given us should have particulars as to all the conditions.

As to the decomposition of the cocain salt, one-quarter of an ampere is not a question to be considered in dental cataphoresis, because from one to three milliamperes is as much as is ever used in dental cataphoresis,—at least, in my experience. One-fifth of a milliampere is sufficient to produce satisfactory anesthesia, and that is one-five-thousandth part of one ampere. It does not seem possible that with so small a flow of current sufficient cocain could be absorbed through the structure of the tooth to produce toxic effects. I have used it, and have seen it used in hundreds of cases, and I have yet to see the least symptom of toxic effect that could not be traced to a leakage, and part of the cocain going into the stomach. The case cited is a typical one, and one hard to insulate so as to maintain the flow into the tooth itself. Electricity will follow the course of least resistance, and the least resistance in the mouth is in the soft tissues. I am strongly of the opinion that it was from without instead of from within the tooth.

Dr. FOSTER. I am certainly very glad that the paper brought forth the discussion that has taken place. I am fully in agreement with many of the statements made, although I shall have to disagree with Dr. Barrett. He was answered very well by the gentlemen who spoke after him. Most of the authorities, in speaking of cocain, agree that where there is toxic effect the intellect remains unaffected. I did not wish to present this paper as against the use of cocain, but merely to show that dangers do arise, and can arise, even where there are many precautions taken to obviate the difficulty. Whether this cocain went through the soft tissues or not, the effect was the same. My impression was that it was a very low amperage, and I think that all care was taken in pushing the gum out of the way so the cocain could not get into it. Should that not have been the case, I am in perfect accord with the gentleman who last spoke. Those in charge, operating before a number of students, would use all precaution in the application to prevent leakage. If a leak existed, the possibility spoken of could arise. But suppose it was perfectly secure? It only gives a case where the idiosyncrasy of cocain is marked, and where we should be very careful. That is the only object in presenting this to you. Do not understand me that I am opposed to the use of cocain cataphorically; but people are using these machines without perfect knowledge of their power.

(To be continued.)

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## SEVENTH DISTRICT DENTAL SOCIETY OF NEW YORK.

(Continued from page 682.)

Dr. F. W. Proseus read the following paper:

### THE PROFESSION AND ITS RELATIONS TO THE ARTISAN AND TO THE LAYMAN.

Much has been said at our dental meetings, and the publications of the profession have devoted pages to the subject of dental ethics and education of the public. I am unable to see where much good has been accomplished.

The advertising dentist still flourishes, and the general public is still uneducated in the care of the dental organs. Many persons are unlawfully practicing as dentists, and the great majority of a certain class still look upon the brag of the advertising man as being a special inducement or favor to them; many believing that the reason others do not advertise is on account of high fees or for lack of skill.

There are three classes of professional dentists, the well-established, the newly-launched, and the so-called quack dentist. Of the former there is very little to be said; they are the ideal, and rightly should they be. It requires skill, time, and business ability to accomplish such attainments.

While we must admit that compensation for services rendered is of vital importance to all classes, we as professional men have instilled within us an impulse that is grand, noble, and far exceeds the material part of our recompense. To do the greatest good to the greatest number, such a feeling has every honest member of our body.

Back of all the strife, ambition, and frivolities of society every normal being wishes for the happiness of others. How well we have this illustrated to-day. The heart of this great nation goes out in pity for the suffering Cubans. Men are willing to sacrifice home and loved ones to accomplish happiness for others. We have read much about the young members of our profession, without means or situation,—an abundance of theory and high ideals. What are we doing for them? Why, in many cases they are driven to professional suicide, and many promising young men are kept from mounting the ladder which leads to the highest pinnacle of fame in our profession.

How many Blacks, Palmers, Millers, Evanses, Peirces, Mortons, Brophies, and Litches have the advertising dentists given to the world? The young alumnus may resolve over and over to start right. He may look about for a situation, calling upon many ethical dentists; if he is fortunate in receiving a position from one such, his future is assured professionally. He is invited to the dental meetings, and becomes active in their behalf. On the other hand, he may go as a last resort to the advertising office and secure a place at small wages, thus being brought under influences which entirely change his former resolutions. The dental societies do not invite him to their meetings; he loses that support which is most needed in his first efforts. His motto is not, How skillfully and well can I do this work? but, How much can I get and how long will it take?

Heretofore the majority of advertising dentists were non-graduates, but their ranks are being rapidly filled with graduated dentists, men that have every ability to practice our profession in an ethical way.

The beginner may hesitate. He says it takes years to establish a first-class dental practice; he decides that a few months will make him financially successful, so he chooses. In years his professional standing is no further advanced than in the first few months. How fortunate it is that it does take years to build up a successful practice. Where would the stability of business be if youth and inexperience could rank with age and experience? What benefit to the public is the advertising dentist? Certainly not in his superior skill. He may pose as a benefactor to the poor patient, but it is not his object in life. As a tooth-saver he is highly skilled, with a cure for all tooth ills,—the forceps. If the pocket-book of the patient does not meet his price, or the time for doing a certain piece of work is great for the amount advertised, the patient is simply told the tooth isn't worth saving. From what class does he draw his greatest income? Certainly not from the poor and dependent, or from the well-informed, prosperous layman. It is from the great rank and file of the artisan and fairly-paid laboring people. They look upon the dentist not as a producer, but as a middleman. They go shopping for teeth and fillings, and the biggest "ad" catches their eye. To them this is perfectly natural; they are looking for teeth, and the man that can brag the loudest and say the most must be to them a great dentist.

The dental profession for years have been talking about education of the public. The ordinary layman knows very little if anything about dental ethics, and I believe there is an increasing faith being established in the quack. He takes a permanent stand, where heretofore many would locate for a short period, then move to new territory.

The quack of to-day has improved in his methods, many doing much good work, but that is not the all-important question. The tendency is to lower the grade of work, becoming purely mechanical, sacrificing many good teeth, inserting crowns and bridges indiscriminately, in their efforts to reach a paying income. Where time is of great importance, it is often more profitable and much easier to extract several teeth and substitute with bridge-work than to treat and fill them properly. Of course the patients do not understand this; it rests with us, as ethical men of the profession, to remove this evil if possible.

It is often remarked that the public press is invariably with the advertising dentists. There are very few publications that try to support a wrong knowing it to be such; we as ethical dentists believe it wrong and injurious to the profession and public. The press looks upon us as business men with wares for sale, overlooking the fact that it is human tissue of major importance the dentist deals with, and that it is not only to the interest of a certain patient, but to the general public health, that these apparently minor truths should appeal.

In certain localities no contagious disease may prevail, yet quarantine is established and supported. If one individual is threatened, the whole community demand isolation and protection. The stability of any government rests upon the perfection of its subjects; without physical health its members are not immune from moral and physical degeneracy. The press of the country will certainly do its duty if the profession will convince them of the truth. There are thousands of people suffering to-day that have not the means for the care of the dental organs.

Can we as professional dentists attend our meetings and discuss material, methods, etc., and forget the great class of helpless sufferers right around us? Individually we owe no duty to them, but collectively it should be demanded by us, and our brothers in the medical profession, that the care of the helpless poor should also include dental services. The child of the pauper has the same right for protection from physical suffering and disease as the child born and bred in luxury.

Many children of poor parents rise to wealth and fame. Through neglect, which they were powerless to prevent, they reach maturity with distorted features, defective articulation, and destroyed organs of mastication. No amount of wealth or skill could restore the loss to them. Therefore, in order to accomplish the greatest good, and obtain the most permanent results, let us begin with the child in school. Compel by legislation the care of the children's teeth. Those unable to pay for dental service should be sent to dispensaries. If the child is educated properly in the care of the dental organs, four generations would give more permanent benefit to the human race than all the dentists could produce in five hundred years under present conditions. Here in Rochester we have now a splendid opportunity to carry out this plan.

There is now an unusually good fellowship existing between the pathologists and dentists of Rochester, and by united efforts, with the support of the press, it can be successfully carried out. No one individual can expect to devote his time to its support, but, as a body of professional men working together, one or two hospitals would assist in maturing our plans. If the compulsory legislation could not be at once brought about, it could at least be demonstrated as a great benefit until such time. Physicians meet with many cases where it is absolutely necessary for the patients to have dental services performed, if they expect beneficial results from medical treatment.

A prominent physician stated the following case to me recently: He is attending a poor woman unable to pay for treatment. She has no teeth; her condition is such that she must be able to masticate solid food to be treated successfully. The physician has gone among friends, and by personal donation raised money to purchase two sets of teeth, and the dentist will probably make them at a reduced price. Here is a condition which is entirely wrong. Should the woman go to the Superintendent of the Poor, she would be told that there are many people without teeth, and that he did not give orders for them. Yet the state may be obliged to support and treat this same patient for years, simply because of improper treatment.

To bring about these results it is highly important to have the people co-operate in the effort to attain them. There is to-day a great body of laboring people united through different organizations, all of which have for their object the betterment of mankind. I propose that a certain number of dentists unite in some such a body independent of all dental societies, become affiliated with the American Federation of Labor, adopt the dental Code of Ethics as by-laws, send a representative to their meetings, advance our objects and ideas through their periodicals, and so get in touch with the very class which we wish to benefit by education in the care of the teeth, and also for their support to bring about compulsory legislation in this line.

To-day there are many dental offices employing men illegally practicing our profession. To prosecute them now we must make a personal report, which a great many refuse to do, and so the profession is wronged and the public preyed upon by men posing as dentists unlawfully. But if there is a law which is statutory it will be rigidly enforced by the members of such a body. Any dentist not adhering to the Code of Ethics would be reported irregular. Prices for services rendered would not be considered, as an individual is entitled to whatever his experience, skill, and position may command.

### *Discussion.*

Dr. F. L. Sibley, Rochester, said he heartily indorsed the spirit of Dr. Proseus's paper, but some of its details he could not fully agree with.

In regard to what has been accomplished in the education of the public, he felt that he was not qualified to make a positive statement. People require more of us every year in skill, and that would lead us to believe that there is a certain amount of education going on in the public mind regarding dentistry. On the other hand, it is very discouraging to find our medical brethren in good standing in their profession ignorant of the fact that we even possess a Code of Ethics, let alone living up to it. Of course, in the city of Rochester our physicians have been enlightened upon this subject, they having come to know more of our profession, certainly have more respect for us, and help in educating the public to care for their teeth, and to appreciate the services of a reputable dental practitioner. This, it would seem, is a long step in the right direction in our city.

Dr. Proseus pays his respects to the advertising dentist. Much can be said regarding this individual; perhaps the least said the better. The speaker had some respect for an advertising dentist who keeps out of the dental society, advertises good work, and gets good prices for it; but for the other individual who advertises his 22-carat crowns and good sets of teeth for five dollars, who has a new and improved system of filling with no pain whatever, and who has many specialties for which he has an expert in every department, he had only the most profound contempt. These men go to our colleges and learn in a comparatively short space of time what it has cost other men years of unceasing labor to know. They absorb all and give nothing, and at graduation in some colleges promise to refrain from unprofessional conduct. Then they go at it deliberately and prostitute their chosen profession for their own selfish ends. What of these pirates? Whom do they injure? Surely not the old and well-established dentist, but they do injure the young man who is endeavoring to build up his practice on professional lines and to get reasonable fees for his services. Some things can be done to regulate this matter; colleges can be stopped from graduating men who they know are going to advertise as soon as they get their diplomas. This society can easily find out whether the operators employed in the advertising offices in this city are regularly graduated and registered in this county. If they are not, they can be prosecuted. This is a duty that we owe not only to the young practitioner, but to the public.

We are all well aware how the infirmaries of our dental colleges are abused, how people come to them and get work done for nothing who could well afford to pay some dentist for doing it. Still, there are many cases where people certainly need the services of a dentist who are unable to pay for them. It would seem that a public dispensary under the management of the poor department might be of considerable benefit.

It is not clear just what Dr. Proseus's idea is of educating the public through the channels of the labor organizations, but the speaker did not think it practical for dentists to take part in the labor organizations as a profession or as a society of professional men. He was sure that any who are able will be glad to contribute to their periodicals articles on the care of the teeth, such as would be of interest to the public.

He did not favor forming any new societies, as he believed all the good to be accomplished can be done through the societies already existing. Much good work has been done by this society in Rochester, but there is much left to do. He did not believe there was a city in the United States where better feeling prevails, where there was less professional jealousy, where the profession was more united, than in Rochester, and with harmony all things are possible.

Dr. PROSEUS regretted that more discussion had not been brought out by his paper. The need of the profession, if we are to lessen this evil of advertising dentists, is for organized work, and we must be organized for this particular purpose. Dental societies as they are have other interests and other aims, and are impotent or careless as to this object. It is said that the advertiser cannot harm the old, well-established practitioner, nor does he, perhaps; but he does harm the profession, and he does harm the young men who will take the place of the older practitioner. The advertising dentist has every advantage over the young man who would be ethical in his professional life. The advertiser poses before the public as a benefactor, as one who is giving good service for less money than the professional man would charge, and the public, seeing this in the advertisements, go to him even though there are plenty of young men struggling to get a foothold in professional life, who would do the service better at as low or a lower cost, and in a perfectly conscientious manner.

As to the dispensary question, we should seek to keep the benefit of such institutions for those who cannot pay for the needed service.

As to the labor organizations and our membership in them, if a number of dentists should join them as suggested they would meet them as artisans, and we could advance our cause through their journals, and their members would be with us in our fight against irregular practitioners. Having won the sympathy of those who are friendly to organized labor, including the vast majority of the newspapers, our strength would be so great that we would make the success of an irregular practitioner well-nigh impossible. See what a power they are over the industries they have in their organization, and you can realize that it is sufficient for the work.

Dr. R. H. HOFHEINZ said that the local societies were not so careless in regard to advertising dentists as Dr. Proseus's paper indicated. Their only duty, however, is to report such cases to the law committee of the state society, who have power to prosecute.

Dr. W. A. WHITE, Phelps, said within a few weeks the committee from the city society had sent two complaints to the state society. He did not consider that there was any way to protect the profession by the help of the labor organizations. The best plan he knew of would be to have a law passed making it obligatory on every man who practiced, whether alone and for himself or as an employee of another man or corporation, to have a sign outside the building in which he practiced, with his name. This would enable the society to know whether he had a legal right to practice or not.

Dr. C. H. Nicholson, Rochester, was opposed to such a scheme as joining any confederation of labor, and if it were attempted we would probably find the advertising dentists there holding positions and in close friendship with leaders of the organizations. You will find them consistent and influential members of secret societies, churches, and all sorts of respectable organizations.

There was no further discussion, and in the absence of the author Dr. W. W. Belcher read the following paper by Dr. A. P. Burkhart, of Buffalo, N. Y.:

## Treatment of Pulpless and Ulcerated Teeth.

Although at present engaged in active practice in the city of Buffalo, I still own residence and claim citizenship in Dansville, therefore am and shall continue my membership in the Seventh District Society. My sympathy and interest lies largely, and naturally so, with my professional brethren in the Seventh. I lack a few months of a quarter of a century of active practice, and nearly all of that time have I been a member of the Seventh, and my connection with the society has not only brought me many pleasant acquaintances, strong ties of friendship, among at least some of my brethren, and mingling with them in discussing various subjects forming a part of our professional duties gave me inspiration and light, and urged on my ambitious spirit in the direction of good dentistry through practical methods.

I am well aware my light has not shone so brightly as that of many of my brethren, and I have not contributed as much as some of the older members of the Seventh have in advancing dentistry and benefiting humanity, and yet I feel at this time that I have something of value at this late day in my professional career. It is with some feeling of diffidence that I offer my experiments and results, because I may with advancing years be charged with drawing on my imagination, and that the results I have obtained in pursuing a certain line of practice are a delusion. I refer now to my method which I have employed in the treatment of dead teeth, with or without established gum opening. It is the latter condition, according to my experience, which has given me the most annoyance in my efforts to relieve my patients with a view of saving the offending and painful tooth. In the years that have come and gone, when I gave my best efforts, patience, and time in attempting to cleanse and disinfect a dirty, foul, stinking tooth (plain English, stink is, but it expresses a heap), and after dressing the root or roots and sealing teeth, fondly hoping periosteal inflammation would disappear and relief positive be given my patient, only to be disappointed, my efforts almost in vain (it seemed to me), when my patient would return crazy with pain, in ugly temper, and, what is more, a badly swollen face, I felt like giving up in despair. By the methods taught me by an able preceptor, close study of dental text-books, and knowledge obtained by coming in contact with my dental brethren in society discussion, my success was perhaps as good as that of the average dentist, but this was not satisfactory; I wanted something better, to enable me to alleviate the suffering of humanity caused by the conditions surrounding the class of teeth I have mentioned. You will pardon me when I say that the treatment and saving of dead teeth for years has been a hobby of mine, all this time, however, being aware that not more than twenty-five per cent. of my patients really appreciated my efforts; but now, whether they appreciate it or not, my present methods give me good results, less anxiety than formerly, and while my patients may not be any more appreciative than those of former years, they are nevertheless subjected to less pain, not so ugly, and certainly not so often disfigured with swollen faces.

Some time during the year 1897 I began to use hot water quite freely in cleansing teeth, by injecting the hot water with syringe with considerable force into the tooth, preparatory to the usual adjustment of rubber-dam over the offending tooth, drying and dressing the same with various medicaments in general use. I next employed listerine in connection with the water, and obtained surprisingly good results, far in advance of the simple use of hot water. The hot water and listerine I used up to five months ago, when I discarded listerine and used in its place Borothymol, an antiseptic manufactured by the Empire City Drug Company, of Buffalo, N. Y. In presenting my methods for your consideration, let me say I shall not enter into a scientific or physiological discussion of my methods or of the composition of Borothymol or other medicaments I may mention. I shall simply state results and describe my manner of treatment, hoping that at least some of my brethren will give my plan of treatment a careful trial, and that they will meet with even more satisfactory and pleasing results than have followed my efforts.

Without further digression I will proceed to describe my plan of treatment, as follows: It matters not whether the gum is swollen over the offending tooth, with or without fistulous opening, or if there is no swelling at all; first of all carefully open well into the pulp-chamber, avoiding the forcing of *débris* into canal or canals. Remove as near as possible all decayed matter in crown with burs and excavators, and make a good-sized opening in the direction of the pulp-chamber. Wash out tooth with tepid water. Having carefully cleansed the crown and secured a clear opening into the pulp-chamber, next with the best broaches (I prefer Donaldson's) open the canal and canals, and remove dead and septic matter, and by all means if possible secure an opening through the root with broach. With patience, care, and skillful hand you can in nearly every instance get an opening through the incisors, cuspids, bicuspids, and large canals in molars without wounding the parts beyond. I do not drill out root-canals; I used to do so, but do not any more. Having carefully with broaches cleansed the root-canals, not forgetting of course to do your best even in small canals found in molars, next begin treatment with hot water and Borothymol. Place in a tumbler two tablespoonfuls of Borothymol, and fill tumbler with hot water. When I say hot water I mean hot, and not warm or tepid. Now fill your syringe with the hot liquid, and wash out the cavities by shooting water against the inner wall of the tooth, to wash out all *débris* in the cavity, and, all having been removed, do the work of throwing the hot liquid into the root-canals. Every now and then pass your broach into the canals to keep them well opened. Use from one to two tumblers of the liquid as prescribed, and, remember, keep it just as hot as the patient will possibly stand it. In the six upper anterior teeth, while injecting same, place the fingers of the left hand, hand backward, into the mouth, which will allow the hot liquid to rebound from the tooth against the inside of the fingers, thus preventing liquid from being thrown upon the face and clothing of the patient, and by this method the heat of the liquid is reduced and made more comfortable for the patient's mouth. Having used Borothymol and hot water as directed, next adjust the rubber-dam, dry cavity and roots with cotton or any other substance, load the cavity and roots with pure alcohol, then force hot air into the tooth persistently and well, give it a second dose, and follow with hot air. Having thoroughly done the work thus far, and the tooth being now well dried, next saturate the cavity and root-canals with a preparation known as Dr. Frank E. Howard's Antiseptic, of which the following is a formula kindly furnished me by Dr. Howard:

Acid carbolic crystals, ʒiv;
Oil cassia, ʒi;
Oil cloves, ʒi;
Thymol, ʒii;
Glycerol, ʒi;
Acid tannic, ℈i.

Having saturated the root-canals thoroughly, I again use the hot air carefully by forcing same into the canals until the liquid has been well forced into the tubuli of the tooth. I next dress the roots lightly with cotton dipped in the liquid just used. Do not pack cotton very tight. Next close upper portion of cavity with a piece of cotton saturated with sandarac varnish. Do not crowd this packing too tightly into the cavity. In about three days have patient return, adjust rubber-dam, remove packing and dressing, and with hot air thoroughly dry the roots, redressing with cotton saturated in the Howard antiseptic. At this sitting pack the cotton a little closer than was done at the first sitting, and then seal cavity with temporary stopping of gutta-percha. In about a week I have the patient return, and I again adjust the rubber, remove the gutta-percha and root-dressing, dry the roots carefully, and fill same with chloro-percha. If the tooth is to be filled with plastics I complete the operation at once, but if it is to be filled with gold I place a temporary stopping in the cavity for a time.

I have had wonderful results in following the methods just described, and I am sure my professional brethren will meet with equal success if they will follow my methods with care and, above all, thoroughness of detail. During the past five months I have treated dozens of dead teeth in all stages of disease and inflammatory conditions, and in all the cases treated I have had but four where I failed to give relief, and no continued pain remained or swelling ensued after the first dressing. In the four cases mentioned I hold myself responsible for having at the first sitting sealed the cavity with gutta-percha instead of cotton and sandarac varnish, and the remaining two I believe I packed the cavity, particularly the pulp-chamber, too tightly with cotton and sandarac. I believe there is a decided advantage in the use of cotton and sandarac as a stopping in the first sitting, because of its porous condition, it acting as a vent. Possibly I may be wrong in the line of treatment I have suggested, and my success may be mere good luck, but I think not.

I shall be pleased to receive reports from such of my professional brethren who may see fit to fully test my methods.

### *Discussion.*

Dr. B. S. HERT said the treatment of dead teeth occupies much time and much of the thought of every dentist. It is very essential to treat them thoroughly, and that a large opening should be made into the canals, and every possible care should be taken to avoid forcing dead matter into the canals. He used hot water, but not as described in Dr. Burkhart's paper, in connection with medicaments; his practice was to use the medicaments afterward. He agreed with the essayist that nothing was better for a root-filling than sandarac and cotton. He did not treat the teeth as often as Dr. Burkhart did, but found that one or two treatments was sufficient. Never felt that it was necessary to drill out the tooth-canal. If the septic matter is well cleared out and the canal carefully filled, there should be no further trouble.

Dr. F. M. ROOD, Rochester, thought that pushing septic matter through the foramen of the tooth was more likely to be the cause of trouble than leaving it in the canal, and care should be taken to avoid it.

The subject was passed.

(To be continued.)

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## UNION MEETING OF THE MARYLAND STATE DENTAL ASSOCIATION, WASHINGTON CITY DENTAL SOCIETY, AND VIRGINIA STATE DENTAL ASSOCIATION.

(Continued from page 575.)

### FIRST DAY—*Morning Session* (Continued).

FOLLOWING is the discussion on the papers of Drs. A. W. Sweeny and W. G. Chase, on dental legislation, printed in full in the July number of the DENTAL COSMOS:

Dr. B. HOLLY SMITH, Baltimore, thought the consideration of the subjects presented in the two papers would serve a most excellent purpose by helping to define the relation the professions of medicine and dentistry bear one to the other, and these relations need not only consideration but adjustment. In his opinion, each dentist should have not only the degree of D.D.S., but the medical degree as well, and though he practiced dentistry he should not be content to take a back seat when among those who practice medicine. Dr. Chase's citations of authority are interesting as showing that a dentist who is not a graduate of medicine has a legal right to prescribe medicines within certain limits. It is a pity that more of them are not qualified to prescribe. Frequently in cases where dental trouble arises from a systemic disease, or where it cannot be successfully treated until the system is restored to health, it is necessary that the dentist should treat the systemic conditions. Should such treatment by any misfortune be followed by ill effects, and the patient take a notion that the dentist had been guilty of malpractice in prescribing for him, and a suit be brought, the value of friendly relations between the dental and the medical professions will become very apparent if a physician is called upon to testify that the dentist had a right to prescribe when the malady affected the dental disease. On the other hand, if the physician is unfriendly to the dentist and testifies that the dentist had no right to treat any part of the body except the oral cavity, the jury will be almost sure to be affected by the testimony of the physician on this point, and the verdict will go as the physician testifies. We for this reason as well as every other reason should carry ourselves professionally so as to gain the good will and respect of our medical neighbors.

Dr. DAVID GENESE, Baltimore, said that in this city a law had passed forbidding pharmacists from prescribing. There was an appeal made against the law on the part of those pharmacists who had been prescribing for years, but the decision was finally against them. Dr. Genese had then sought advice as to prescribing by dentists, and had been instructed that under the law a duly qualified practitioner of dentistry had a right to prescribe when the disease affected the dental organs.

Dr. WM. A. MILLS said that recently it seemed to him dentists were more frequently called upon to prescribe than was the case formerly; cases of neuralgia or of nervous breakdown from toothache were frequent where the dentist must prescribe to cure the trouble, and should be prepared to advise treatment of any character whenever necessary for relief. His relations with his medical associates were of the pleasantest character, and the physicians do not bring his prescriptions into question if one of his patients has to consult the doctor.

Dr. W. A. MONTELL, of Baltimore, said the questions treated by the paper were very important. It has been for years the practice of dentists to treat systemic troubles when they affect the teeth, and the dentist must necessarily, if he would carry on his practice safely, know enough of medicine to enable him with confidence to meet the accidents which are liable to occur. There are dangers in dental practice arising from the use of anesthetics and cocain, for instance, which every dentist must be ready to meet. Besides the disease which affects the health of the mouth he may treat, but with certain limitations. We ordinarily treat only local troubles, not the systemic disease which causes the trouble. For instance, we know that tuberculosis, Bright's disease, and syphilis all have disastrous effects upon the mouth, but the dentist would not therefore undertake to treat these diseases, but would rather send the patients to the physician for relief, and if necessary defer the treatment of the teeth till the system has been restored in tone and condition. As long as we confine our attention to the local disease we will have no opposition from the physician, but unless we do, they will properly resent our interference in their domain.

Dr. M. F. FINLEY, Washington, spoke of the law governing the practice of dentistry in Washington. Soon after the dental law was passed by Congress, the medical men had a law passed controlling the practice of medicine containing very rigid proscriptions of those who were allowed to practice medicine. One of the most active dentists in the city in professional work, Dr. Williams Donnally, exerted himself and had a clause inserted in the medical law providing that dentists should have a right to practice medicine to the extent covered by the curriculum of the standard dental colleges.

Dr. H. B. NOBLE said he had intended to speak of this provision of the medical law of the District of Columbia, as, under the present circumstances, it opens a wide legal field for dentists to practice medicine. We certainly have a right to treat medically or surgically any disease or accident affecting the mouth, jaws, or adjacent parts. In Washington he had made the judges of the court decide that he (Dr. Noble) was exempt from jury duty on the ground that he was a surgeon.

Dr. CHASE said the question of the rights and limitations of legal practice of dentistry was of vital importance. He had many friends among medical practitioners, and he thought it well to do all possible to preserve good feeling. He thought all laws should plainly give the dentist the right to prescribe when necessary. There are three things that bear on the question,—they are command, sanction, and duty. The patient commands us to treat him in all things necessary to successful dental treatment. Does the law sanction our so treating him, and if it does, is it not a duty to be able to do all that is necessary to give relief? He spoke of a patient who came to him suffering with neuralgia. The patient thought it was the result of a decayed tooth, but upon examination Dr. Chase concluded it was the result of a cold, and prescribed remedies which proved effective. Some time after the patient reappeared, saying he was suffering with a return of the same cold, and Dr. Chase refused to treat him and sent him to a physician.

Dr. NOBLE, speaking of the subject of Dr. Sweeny's paper, said that in his opinion the dental laws had done much good, and one of the good things they had accomplished was to stimulate the dental colleges to better work. Unfortunately, there was at present a feeling of antagonism between the colleges and those who directly represented the dental laws, the dental examiners. This was unfortunate, as these two bodies should work hand in hand for the good of the profession. He admitted that the dental laws had not done as much good as it had been hoped they would, but thought in many cases it was because they had not been as carefully drawn up as they should be. He thought dental laws should punish any man who practiced dentistry or extracted teeth without legal qualification, whether he received a fee for it or not. There was no intention when examining boards were created to set them up against or above the colleges, but differences have arisen between them in some cases which have been unfortunate. They should work in harmony, and if examinations are to be made, he thought they should be made before, and not after, the diplomas are granted. He also thought it was a great injustice for a man who wished to practice in another state to have to stand a re-examination.

Dr. H. S. HARVEY, of Battle Creek, Mich., thought dentists found themselves in an unfortunate position before the public because the rank and file of the profession were not better qualified for their work than they are. The skill in the average dentist is not as great now as it was forty and fifty years ago, and gold filling as it was done by the best practitioners then was better than is done to-day.

Dr. JOHN B. RICH, of Washington, said dental laws did little because they attempted to do too much. He recently was discussing the dental laws of the District of Columbia with a Congressman who, upon examining the law, said the dentists must be a set of rascals or they would not need such a law. Dr. Rich told him that they were not rascals, but that there was a natural tendency with some men when they had an opportunity to do so to tyrannize over others, and the law was an example of such tyranny by those who have got up in the world to keep down those who are starting. It is so, too, with codes of ethics,—they are all objectionable.

Dr. CHASE said it was an undoubted fact that many of the dental laws were cumbersome. The law of New Jersey made the practice of dentistry in that state a close corporation, as the dental examiners have everything in their own hands, but he did not think any reputable practitioner from another state who came with the indorsement of his state society would have any trouble in getting the right to practice.

Dr. A. J. VOLK, of Baltimore, thought it was an outrage that an examining board or any other body should have the power to refuse a license to practice after a regularly chartered and legal institution had granted a diploma. Such action on the part of the examining board made the diploma of no value.

Dr. B. HOLLY SMITH thought the only sane thing for the profession to have in the way of law in the United States was a general law governing the practice in every state. He told of a letter he had received from a dentist somewhere in North Carolina, who had been practicing both at home and in the adjoining township. Another dentist who lived in the adjoining township practiced there and in this man's township also. This dentist finally had a regulation passed in his township that non-residents practicing dentistry should have to pay for a license to practice there; then this dentist had applied for a like regulation in his township, but a regulation was passed making it obligatory on all who practiced dentistry in that township to pay for the privilege, so this man had to pay license in both townships, very much to his disgust.

Dr. SWEENY in closing the discussion said that he was not opposed to all dental laws, but hoped to be instrumental in improving them. All that he had ever seen had had faults. In practical operation they all appear to expend their energies in the wrong direction. Again and again it has come to his observation that men who had no desire except to practice in the most honorable manner have been interfered with, while the most unblushing quackery goes unmolested. Every examining board should have it in its discretion to allow a man to practice who could show that he had practiced in another state in a legal manner.

(To be continued.)

## HARVARD DENTAL ALUMNI ASSOCIATION.

THE Harvard Dental Alumni Association observed Monday, June 27, 1898, its second "Alumni Day," at the Dental School, where nearly one hundred and fifty individuals registered their names in the registry book.

The work of the school covering the three years was shown by specimens and patients present.

At Young's Hotel, Boston, in the evening, was held the twenty-seventh annual meeting and banquet, with ninety-three persons present. Rev. Edward M. Taylor, D.D., of Cambridge, the guest of the evening, spoke, his subject being "The Man for the Twentieth Century." Other speeches were by Professor Eugene H. Smith, dean of the school; Professor Thomas Fillebrown, and Harry L. Grant, A.B., who responded for the class of '98.

The following officers were elected for the ensuing year: Frederick Bradley, '86, president, Newport, R. I.; Edwin C. Blaisdell, '83, vice-president, Portsmouth, N. H.; Waldo E. Boardman, '86, secretary, Boston, Mass.; Harry S. Parsons, '92, treasurer, Boston, Mass.; Waldo E. Boardman, '86, chairman *ex-officio*, Boston; William P. Cooke, '81, Boston; Patrick W. Moriarty, '89, Boston, executive committee.

The Council is composed of the officers of the association.

WALDO E. BOARDMAN, '86, *Secretary.*

## MISSOURI STATE DENTAL ASSOCIATION.

AT the thirty-fourth annual meeting of the Missouri State Dental Association, at Planter's Hotel, St. Louis, July 5-8, 1898, the following officers were elected: F. M. Fulkerson, Sedalia, president; F. F. Fletcher, St. Louis, first vice-president; W. L. Reed, Mexico, second vice-president; B. L. Thorpe, Billings, corresponding secretary; H. H. Sullivan, Kansas City, recording secretary; James A. Price, Savannah, treasurer.

B. L. THORPE, *Cor. Sec'y.*

## TEXAS DENTAL ASSOCIATION.

THE Texas Dental Association held its annual meeting at Waco, May 17 to 19, 1898. A good attendance and an interesting meeting was the result.

The following officers were elected: Dr. M. S. Merchant, Giddings, president; Dr. J. W. David, Mexia, first vice-president; Dr. O. B. Love, San Antonio, second vice-president; Dr. J. G. Fife, Dallas, secretary and treasurer; Dr. A. F. Sontag, Cleburne, curator of museum. Executive Committee, Drs. H. L. Pearson, McKinney; J. M. Nash, Brenham; L. P. Robertson, Marlin. Delegates to the National Dental Association at Omaha, Drs. R. H. Griffis, Bush Jones, E. V. Hames, O. F. Gambati, W. C. Collier, J. M. Weems, Jr. Delegates to the Southern Branch at New Orleans, Drs. Thos. P. Williams, O. B. Love, H. W. Hoffer, M. S. Merchant, T. S. Cartwright, L. P. Robertson, S. J. Duff, W. R. Rathbone, E. F. Comegys, T. W. Smith.

Waco was selected as the next meeting place.

J. G. FIFE, *Secretary.*

## CONNECTICUT STATE DENTAL ASSOCIATION.

AT the annual meeting of the Connecticut State Dental Association, held at Hartford, May 17 and 18, 1898, the following officers were elected: Dr. A. J. Cutting, Southington, president; Dr. H. G. Provost, West Winsted, vice-president; Dr. Edward Eberle, Hartford, secretary; Dr. D. A. Jones, New Haven, treasurer. Executive Committee, Dr. J. F. Wright, Hartford, chairman; Dr. J. Tenney Barker, Wallingford, and Dr. P. A. Powers, Meriden.

EDWARD EBERLE, *Secretary.*

# DENTAL SOCIETY ANNOUNCEMENTS.

## NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

NOTICE is hereby given that the next annual meeting of the National Association of Dental Examiners will be held at Washington, D. C., commencing ten o'clock A.M., Thursday, October 13, and continuing in session the 14th and 15th. The headquarters will be at "The Hamilton," Fourteenth and K streets, opposite Franklin Park. The rates will be $2.00 and $2.50 per day.

Members can communicate with Dr. H. B. Noble for additional information regarding accommodations.

The poll vote closed August 9, with seventy-two votes for Washington, twenty for Louisville, seventeen for Chicago, and twelve for Omaha, balance scattering.

CHARLES A. MEEKER, D.D.S., *Sec'y.*,
29 Fulton st., Newark, N. J.

## VERMONT STATE BOARD OF DENTAL EXAMINERS.

THE next meeting of the Vermont State Board of Dental Examiners will be held in the Pavilion Hotel, Montpelier, October 18, 1898, at 2.30 P.M.

GEO. F. CHENEY, *Secretary*,
St. Johnsbury, Vt.

# EDITORIAL.

## TWICE-TOLD TALES.

THE average reader of current dental literature cannot fail to have been struck by the continuous repetition of ideas which flows on its unceasing course through our periodical publications. It is not a peculiarity of dental literature of the present time, but seems to have existed from the beginning. This defect, for it is a defect, has been pointed out time and again by dental writers, and various causes have been assigned in explanation of it. Not many years ago it was asserted by a prominent dental writer that the dental profession "was largely written out," and the cause of the constant republication of time-worn ideas was attributed to a paucity of mental activity and a lack of new subject-matter in dentistry. That this was an erroneous view has been amply disproven by the literary and scientific output in dentistry especially during the past decade.

At no time have the contributions to our stock of knowledge and our literature been more important or voluminous than during the period alluded to. The spirit of investigation, stimulated by the labors and scientific achievements of a few earnest workers, has made its impression for good upon the mass of the dental profession. We hear less than formerly of the criticism of the self-styled "practical man," that scientific investigation is "all theory" and of "no practical use." It has come to be believed by a fair majority that honest scientific investigation may and does lead ultimately to practical results, that "scientific" and "theoretical" are not interchangeable terms, and that practical and scientific may be when fairly defined and so used.

But notwithstanding this definite change in professional thought, the rehabilitation and repeated publication of old ideas goes on with uninterrupted regularity until one would suppose there was scarcely a dentist to be found on this planet who had not become familiar with these periodical visitors in the shape of antiquated thoughts done up in new dress.

We all know, for example, that lead and zinc mix about like oil and water, and the most of us could separate them if we had to.

We know that zinc phosphate in a soft state, and for some time thereafter, is a dentinal and pulp irritant, and we know the reason why. We know how to make a colorless solution of iodin, and we know that squeezing out surplus mercury from an amalgam mix is squeezing out not surplus mercury alone, but a fluid amalgam, and we know also that it alters the composition of the original alloy; and there are some of us who are not greatly disturbed by that fact, either.

We know that carbolic acid is a coagulant, and that it will destroy an abscess sac; that pyrozone will bleach, that iodin and pumice will remove green-stain; that medicaments can be forced through an abscess tract by a hypodermic syringe, the point of which is passed through a packing of unvulcanized caoutchouc in the cavity of decay; and we know that we could continue the list indefinitely of things which are part of the mental equipment of every freshman, or at least junior student in any reputable dental college, but which are regularly displayed on the literary tray of dentistry for the delectation of those who want them not.

Two causes may be in some degree responsible for the state of things noted. First, the rapid multiplication of dental periodicals necessarily increases the demand for matter, and it may be that insufficient editorial care is bestowed upon the selection of material to supply the space demands of their publications. It is not to be supposed that an editor will ever be developed whose range of knowledge of dental literature will be so exhaustive as to enable him to infallibly exclude all that has become ancient history from his pages, yet a tremendous improvement in this regard could be brought about with a little more editorial care.

The second cause is one to which may be assigned a psychological origin in addition to the common one of lack of knowledge. It is a well-known fact that the same phenomena are discovered again and again by different observers, and where, as is usually the case, no knowledge of the previous discovery is had, the new discoverer proclaims his find as original and heralds his good fortune in print. Or again instances are by no means wanting where some more modest worker had discovered a "good thing," and in a moment of professional generosity he divulges it to his colleague; the said colleague, after testing the suggestion to his comfort, satisfaction, or financial betterment, has gradually forgotten whence he obtained it and finally comes to regard it as a child of his own brain, and in due time reads a paper upon it for the benefit of himself and his profession. The original discoverer has, however, continued his quiet dissemination of knowledge until the fact has become generally known and has passed through several stages of publication before the paper referred to has been read.

Mistakes of this character and much useless repetition of matter could be largely avoided if the writers of papers and speakers at dental meetings would make themselves reasonably familiar with their topics before speaking thereon. It would also relieve dental editors from much personal criticism, not to mention the labor involved of striking out obsolete matter from papers submitted for publication, and which the authors thereof often deem of great originality and importance. Another preventive of useless repetition of matter and the best incentive for the production of really valuable material for publication is the cultivation of the habit of observation and research. No man's time is so fully occupied with professional or other work that a portion cannot be devoted to investigation. One well-made observation is of more value than many crude efforts at professional guessing. If any one doubts, let him pay attention to the certainty with which any such report finds its way around the whole circle of dental publications, and the result will astonish him.

## CORRECTION.

By a clerical error our report of the commencement exercises of the Boston Dental College makes it appear that the dean of that institution conferred the degrees upon the graduates.

The degrees, we are informed, were conferred by the president.

## BIBLIOGRAPHICAL.

ORAL PATHOLOGY AND PRACTICE. A TEXT-BOOK FOR THE USE OF STUDENTS, ETC. BY W. C. BARRETT, M.D., D.D.S., M.D.S. Octavo, pp. 239. Philadelphia: The S. S. White Dental Mfg. Co., 1898.

The acknowledged need for a satisfactory text-book on dental pathology has met its response in the recent appearance of several works on the subject, each having a distinct individuality. It would not be fair, even were it possible, to critically compare these efforts, as each, though dealing with the general subject, is more especially devoted to the exposition of certain of its phases and strongly emphasizes those departments deemed by their authors as of greatest importance. As would naturally be expected, Dr.

Barrett's book is a strongly individualized production, and therefore is to be regarded as an exposition of the views which he personally holds. And further, the manner of presentation is that of one who is firmly convinced of the correctness of his position. These two characteristics are to be borne in mind in judging of the volume under consideration. The range of topics treated is ample and includes all that at present may be deemed of practical utility to the dental student, and the way in which the subject-matter is presented is concise and entirely free from verbiage. As to the matter itself, there is much to which we would take exception, for the simple reason that we hold views which are in a number of instances at variance with those of the author. For example, page 12, the axiom is laid down that "The most material factor in the prevention of the increase of the zymotic diseases is the resistive power of the healthy animal function." With the essential truth of this we are in perfect agreement. In support of the proposition the author cites the experiment performed of inoculating twelve rats with an organism to which under ordinary circumstances they were immune. Six of the rats had, however, been previously subjected to severe and exhausting labor in a treadmill, and these latter took the contagion and died, while the six normal rats, whose nervous vitality had not been diminished, escaped the contagion altogether. By this and similar experimental and clinical data it is shown that when "the bodily tone is depressed through malnutrition, by unsanitary conditions, by fatigue or exhaustion, or because of functional disturbances," the resistive force of the body is so much weakened that it becomes liable to infective disorders. We regard this as not only correct reasoning, but of fundamental importance in the study of all reactions of the vital tissues to pathologic influences. But we are at a loss to understand why the author, though recognizing the general principle so clearly, should fail to specifically apply it to his reasoning concerning diseases incident to dentition. It is in the study of the group of disorders which are coincident with the first dentition that this principle is fundamental, and if the author had investigated the subject clinically with his usual perspicacity he would have quickly concluded that the impeded eruption of a deciduous tooth in the sensitive organism of a human infant could produce nervous depression and vital exhaustion at a rate which would leave the six rats in a treadmill far behind in the race toward infective susceptibility.

At page 72 the reader is left in some doubt as to whether in caries of dentin, infection precedes the decalcification or the reverse, the tendency being toward the former conclusion. Yet it is difficult to conceive of the process of dentin infection taking place without previous slight decalcification having prepared the way for the entrance of the acid-producing bacteria into the tubuli, and such we understand to be the view of Professor Miller.

The explanation of the method of formation of salivary calculus we believe to be incorrect, as well as the inference that the material itself is essentially calcium carbonate. Analyses by Schehevetskey, Stevenson, and others show the presence of from seventy to eighty per cent. of calcium phosphate in tartar, and the method of its formation we are inclined to believe is more nearly set forth by Burchard.*

In the chapter upon pericemental inflammation the author re-emphasizes his views concerning the anatomical character of the nervous and vascular supply to the pulp. In view of recent investigations the ground taken upon this point appears too sweeping and the conclusions too dogmatic. We regard it as far from proven that in a normal mature tooth "the foraminal opening is not a single direct aperture, having its axis in line with the pulp;" on the contrary, we hold that to be the normal arrangement, and such conditions as the author describes as variants therefrom.

We have cited these features of the work merely as evidence that it contains matter which will necessarily arouse contention, but the author practically disarms criticism by assuming full responsibility for the views which he holds, and the strong points of the book will give it a place among our text-books which it fully deserves. It is a work by a teacher for students, and those who use it as a groundwork for their own exposition of the subject will present their own modifications of the conclusions upon which they may differ from the author.

ORTHODONTIA, MALPOSITION OF THE HUMAN TEETH, ITS PREVENTION AND REMEDY. By S. H. GUILFORD, A.M., D.D.S., Ph.D. Third edition, revised and enlarged. From the press of T. C. Davis & Sons, Philadelphia, 1898.

As set forth in the preface to the first edition of this work, it was written at the request of the National Association of Dental Faculties, to be used as a text-book in the many colleges. That it has successfully fulfilled its purpose is shown by the exhaustion of two previous editions and the frequent reference to the volume found in writings upon orthodontia. It might seem almost a labor of supererogation to review a text-book for the third time, were it not that text-books should be altered and improved to keep pace with the subjects of which they treat. It is a gratification that the author follows so closely the suggested changes, and adopts promptly the actual improvements in orthodontia; in a word, the book is worthy of the commendation it has received. So much for the reviewer's standpoint; from the point of view of the critic exceptions must be taken here and there to slight inaccuracies which have remained uncorrected. On page 52 it is stated the pulp is the formative organ of the tooth; it is the formative organ of but one of the dental tissues, the dentin. Again, "the pulp contains a delicate system of lymphatics." No lymphatics have yet been demonstrated in this organ.

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*DENTAL COSMOS, October, 1895.

The nature of the pathological conditions induced in the pulp by injudicious "regulating" is not mentioned, and the descriptions of cementum-building are inexact.

The type of articulator shown would scarcely be a sufficiently accurate guide as to the direction, character, and extent of movement to be effected. The use of the Bonwill articulator should have been described in this connection.

The arrangement of the subject-matter, satisfactory although it has been in the main, would be improved if it were classified after a clear, logical method, as seen in many text-books.

GRAY'S ANATOMY, DESCRIPTIVE AND SURGICAL. New American Edition. Philadelphia: Lea Brothers & Co., 1898.

In the July, 1897, issue of this journal we published a critical review of this standard work and directed attention to a number of defects in its illustrations of dental subjects, as well as to a number of ancient errors of fact pertaining to the same department of human anatomy.

We have been favored with a copy of the latest printing of the American edition, and are pleased to note a detailed correction of the faults alluded to. All of the text relating to the teeth, and all illustrations in which teeth are figured, have been carefully revised and corrected. Some entirely new engravings have been made to replace faulty ones. All illustrations in which the teeth appear have been altered so that they are now correct in relative sizes and positions as well as in anatomical form and relation to their antagonists.

The first part of the chapter on the organs of digestion has been entirely rewritten to accord with the most recent researches in anatomy, descriptive, surgical, histological, and embryological. It is a matter for congratulation that this careful revision has been done, for it is doubtless the first of the standard works on anatomy in which the importance of a correct rendering of the dental aspect of the subject has been recognized, and as a consequence it stands alone as the text-book best adapted to the needs of dental students in this branch. The work of dental revision was, we are informed, intrusted to Dr. H. H. Burchard, which is a sufficient guarantee of its thoroughness and accuracy.

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# OBITUARY.

## DR. GEORGE P. RICHMOND.

DIED, at Lansing, Mich., August 3, 1898, Dr. GEORGE P. RICHMOND, in his forty-ninth year.

Dr. Richmond was born at Chardon, Ohio, in 1849, and at two years of age was taken to Watertown, Mich., where he resided with relatives, attending school and working upon a farm until eighteen years of age, when he began the study of dentistry. In the early 70's he began practice in North Lansing, and established a reputation as an expert in his profession. He was especially interested in physics and mechanics, and showed much genius as an inventor. He patented an electric motor, several minor inventions, but was principally concerned in the invention of the telephone, in which it is claimed he was entitled to priority over the Bell invention. He was also credited with the invention of a phonograph. The Richmond Cotton Pellet Roller was his device. Dr. Richmond was a man of exceptional talent and of high virtue, and his death is a great loss to dentistry, as his life-work and study were devoted to the advancement of his profession.

His remains were cremated at Detroit, Mich., on August 5, in accordance with his own wish. He was married in August, 1875, to Miss Ida E. Carter, of Lansing, who with two children, a son and daughter, survives him.

## DR. M. J. O'CONNOR.

DIED, August 6, 1898, at Santiago de Cuba, of pernicious malarial fever, Dr. M. J. O'CONNOR.

Major O'Connor was born in Boston, January 31, 1861, in what is now South street. He attended the Boston schools, graduating from the Bigelow Grammar School in 1874, and from the English High School in 1877. After that he learned the upholstering trade, but he had higher ambitions, and after several years in the trade he decided to study dentistry, and in 1885 entered the Boston Dental School, taking a three years' course in dentistry. He graduated in June, 1888.

About the time he left the dental college he joined the militia, taking a prominent part in forming Company I, of the Ninth Regiment. He was soon elected adjutant, and not long afterward became major in the regiment. He was greatly interested in its work, and labored indefatigably in its behalf. When the war broke out he was anxious to go to the front.

Dr. O'Connor was a man of sterling worth and integrity, a great favorite with all who knew him, and his untimely death comes as a shock to a large circle of his friends, especially as he was of a strong, rugged constitution, and one who would have been expected to have escaped the fatal results of the exposure to which he was subjected.

He was unmarried, living with his sister, Mrs. T. J. Giblin, South Boston. Two other sisters and two brothers survive him.

## PERISCOPE.

Disease of the Antrum.—In an article entitled "Remarks upon the Non-Operative Treatment of Chronic Suppurative Disease of the Antrum and Vault of the Tympanum," Dr. A. H. Buck, Clinical Professor of Diseases of the Ear, College of Physicians, Medical Department Columbia University, New York, emphasizes the value of simple cleansing methods in the treatment of these cases.

As regards the details of the cleansing methods he remarks that it consists essentially of only two steps,—viz, the removal, chiefly by mechanical means, of all granulation-tissue, casting off epithelium and detritus from the diseased tympanic cavity or antrum, and the destruction by chemical means of all pathogenic germs. Injections of hydrogen dioxid through variously curved glass tubes play a very important part in the procedure, not simply on account of the germicidal action of this fluid, but largely because the active effervescence, which at once takes place when it comes in contact with decomposing organic material, aids in dislodging the obstructing substances. When once the cavity has been cleared of all these, and rendered aseptic, powdered iodoform or one of the more recent antiseptic powders (europhen, aristol, etc.) should be introduced in liberal quantities and allowed to remain indefinitely.—*Medical Record.*

## HINTS, QUERIES, AND COMMENTS.

Tinning Silver Plates.—In a recent number of the Dental Cosmos I find the statement made by an essayist "that it is necessary to send a silver plate to a tinsmith to have it tinned," so that adhesion between plate and vulcanite can occur. Any mechanical dentist can tin his own plates with perfect success and with ease.

It is of course a well-known fact that not only is any silver surface, brought into contact with vulcanizable rubber at a vulcanizing heat, soon covered by a film of silver sulfid from the reaction between the metal and the free sulfur in the rubber, but the contact surface of rubber fails to vulcanize,—*i.e.*, the presence of the silver prevents the chemical combination of sulfur with caoutchouc which occurs in vulcanizing by reason of the superior affinity of the silver for the sulfur. If a film of metal unaffected by the sulfur be interposed between the rubber and silver, vulcanization occurs. The intermediates used for this purpose have been a film of gold made by electro-deposit, a sheet of gold or of tin, carefully molded over the metallic surface to be covered by the vulcanite, and a film of pure tin melted over the surface to be vulcanized upon. From practical experience with all methods, the writer has found the last-mentioned to be the best of all, and the most easily followed.

The silver plate is swaged, the rim wire outside and inside is soldered to the piece, the teeth are arranged, and the proper positions of the retaining cleats are determined. These cleats are made of scraps of silver plate bent into W forms. At least three of these cleats should be made, after the following manner: Strips of silver plate about one-eighth inch wide and one inch long are filed clean, dipped in a saturated solution of zinc chlorid, and rolled in tin foil No. 4, then held high above a Bunsen flame until the tin melts. They are then bent to the W form; one is to be placed at a middle point of the plate, one on either side beneath the molars, and it is better if one be placed under the bicuspids of both sides. These cleats are to be soldered to the plate by the tin used in tinning. The plate is warmed until the teeth and wax can be removed without bending the wax or disarranging the teeth. The plate is boiled in sulfuric acid, and the surfaces to be covered by rubber and the wire are polished bright. The plate is set upon the die, and the entire surface to be vulcanized over is spurred by using an angle of a sharp vulcanite chisel to raise barbs closely placed over the entire surface, similar to the barbs upon a broach.

The barbed surface is now painted with zinc chlorid, and a sheet of tin foil No. 4 is pressed upon the surface until the latter is covered. The plate is now held above, not in, a Bunsen flame until the tin fuses. The even distribution of the tin is assured by passing the brush charged with zinc chlorid over the tinned surface until the surface is seen to be perfect. The cleats are next set in position and the plate heated as before, when the tin fuses and attaches the cleats. The plate is now scrubbed with strong soap; do not pickle it! The wax and teeth are returned to position, waxing perfected, and the piece is flasked so that no silver is exposed, and, when the wax is removed, no metal other than the tinned surface is visible. If these directions are carefully followed out, the attachment of the vulcanite is as close as with gold plates. The writer has observed in cases where the electro-deposit method has been followed a disposition of the gold to strip away from the silver. Of course, if cleats and barbing be sufficient, this makes no difference.—H. H. BURCHARD.

TO THE EDITOR OF THE DENTAL COSMOS:

*Sir*,—In the November, 1897, COSMOS is an article by Dr. Stowell, of Pittsfield, Mass., in which he advocates the leaving of large masses of decay in cavities, covering them with a cement containing more or less hydronaphthol. By using this method he asserts that "good old Dame Nature" has an opportunity to restore the diseased condition to a state of health.(?) I should be very grateful to any of the readers of the COSMOS who have used this method and succeeded in persuading "good old Dame Nature" to do this work, if they would let me hear how they have succeeded in doing it. As I understand, decay is something dead. That particular portion of the tooth that is decayed is robbed of its life. It is as Miller says, "Masses of micrococci and bacilli which penetrate the dentin stop up the tubules, and must lead, sooner or later, to the death and destruction of the dentinal fibrils, in consequence of which the outer layers of the dentin lose their nutritive connection with the pulp and die from lack of nourishment." Therefore the placing of a cement filling containing hydronaphthol on the decayed portion is merely keeping in the tooth so much poison. It is an impossibility for a powder to penetrate this dead mass and destroy the micrococci and bacilli that are underneath it. It is well to remember that any remedial agent powerful enough to destroy micro-organisms is also strong enough to either destroy or impair the vitality of the pulp in the tooth. I cannot help feeling that one might as well say by rolling a putrefying hand in hydronaphthol, the rest of the body being in good condition, that "good old Dame Nature" would restore the hand already dead to a condition of health, provided it was given a chance. We know better than that. I, for one, cannot accept Dr. Stowell's theory.

As regards the treatment of abscesses, etc., with the twenty-five per cent. solution of hydronaphthol, a simple experiment will show how fallacious the whole theory is. Take a block of ivory two inches square, with a quarter-inch drill cut four cavities in it one-eighth of an inch deep, let them be considerable distance apart. Fill one with Black's 1-2-3, another with oil of cloves, the third with oil of eucalyptus, and the fourth with the twenty-five per cent. solution of hydronaphthol. Some of the Black's 1-2-3 and oil of cloves will still remain in the cavities at the end of four days. Within fifteen minutes after filling the cavity with the solution of hydronaphthol it will have disappeared, leaving only a scale. On this account it is practically without any value, for the simple reason that it does not penetrate the dentinal tubules, but merely forms this scale around the surrounding surfaces. Abscesses, etc., show there is some cause for irritation. The pericemental membrane cannot become inflamed without some cause; when this is removed, the treatment should be of a stimulating nature to restore the parts to one of health.

The question may be asked to what extent the different remedial agents will penetrate the ivory. This can be ascertained by performing the experiment described and carefully examining the ivory.

It would please me very much to hear from others as regards this subject, and learn what their experience has been with it.

J. CARLTON FRYE.

ST. PAUL, MINN.

# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

**Australian** (The) Journal of Dentistry. A monthly review of dental science. Melbourne. No. 10, vol. 1, 1898.

**Brandt** (L.) Klinik der Krankheiten der Mundhöhle, Kiefer und Nase. Berl., 1898, A. Hirschwald, 56 p. 8°.

**Greve** (H. Christian.) Heilmittellehre für Zahnärzte. Stuttg., 1898, F. Enke, 248 p. 8°.

**Jung** (Carl.) Die Handhabung der Instrumente zur Extraction des Zähne. Leipz. u. Wien, 1898, F. Deuticke, 26 p. 8°.

**Nawroth** (Paul.) Zahnärztliche Standesordnung ein Augstprodukt des Konkurrenzneides und "aerztliche Reklame." Ein zeitgemässe Betrachtung über eine unzeitgemässe Einrichtung. Breslau, 1898, Th. Schatzky, 16 p. 8°.

---

**Albert** (H. L.) Le sulfo-cyanure de potassium dans la salive. Progrès dent., Par., 1898, xxv, 161–165.—**Amoedo** (O.) Le rôle des dentistes dans l'identification des victimes de la catastrophe du Bazar de la Charité, Paris, 4. mai 1897. Odontologie, Par., 1898, 2. s., vi, 491–502.—**Ancel et Thiry**. Une observation d'actinomycose humaine avec étude bactérilogique. Rev. méd. de l'est, Nancy, 1898, xxx, 358–371.—**Arkövy** (J.) Experimentelle Untersuchungen über Gangrän an der Zahnpulpa und Wundgangrän. Centralbl. f. Bakteriol. [etc.], 1. abt., Jena, 1898, xxiii, 917; 962, 1 pl.—**Arrington** (B. F.) Preservation of natural teeth on a conservative basis of treatment. Am. Dent. Weekly, Atlanta, 1898, i, 557-560.—**Battershell** (F. E.) Death of the dental pulp. Ohio Dent. J., Toledo, 1898, xviii, 315.—**Baumgarten**. Geschwüre des Harten Gaumens. Monatschr. f. Ohrenh., Berl., 1898, xxii, 278-280. **Bayeux** (R.) Le tubage du larynx. Ann. de méd. et chir. inf., Par., 1898, ii, 264; 416.—**Beaudouin** (G.) Glossite exfoliatrice. Ann. de dermat. et syph., Par., 1898, 3. s., ix, 554.—**Belyea** (F. S.) Treatment of carious approximal surfaces in bicuspids and molars. Dental Digest, Chicago, 1898, iv, 310-316.—**Benton** (Charlotte E.) Gutta-percha lining under cement. Items Interest, N. Y., 1898, xx, 491.—**Bickel** (O.) A case of empyæma of the antrum of Highmore. *Ibid*: 485-487.—**Black** (G. V.) Western Dental Journal on amalgam tests. Dental Digest, Chicago, 1898, iv, 297-301.—**Black** (J. A.) Modernized methods for the removal of inferior dental nerves for neuralgia. Tr. M. Soc. Calif., 1898, xxviii, 111-113.—**Blair** (J. C.) A case in practice. Ohio Dent. J., Toledo, 1898, xviii, 314.—**Blakeman** (R. I.) Two cases in orthodontia. Indiana Dent. J., Indianap., 1898, i, 623-629.—**Boeseke** (B. C.) Our instruments. Pacific Med.-Dent. Gaz., San Fran., 1898, vi, 261-264.—**Bonnes** (A.) De la voix eunuchoïde et de son traitement. Rev. internat. de rhinol., otol. et laryngol., Par., 1898, viii, 624-645.—**Bonwill** (W. G. A.) Cataphoresis vs. The direct application of the galvanic current for obtunding sensitive dentine and how to exclude both. Dental Reg., Cincin., 1898, lii, 255-261.—**Boguel** (A.) Névralgie rebelle du maxillaire inférieur; section du nerf dentaire inférieur au niveau de l'épine de Spyx; guérison. Arch. méd. d'Angers, 1898, ii, 262-265.—**Branigan** (E.) The need of dental instruction in medical schools. Dental Reg., Cincin., 1898, lii, 261-264.—**Bright** (C. S.) The dental status in Italy; past and present. Dental Rec., Lond., 1898, xviii, 297-301.—**Brigiotti**. Articulation défecteuse accompagnée de tic. Odontologie, Par., 1898, 2. s., vi, 505-511.—**Brodtbeck** (A.) Gestanzte Metallkauflächen bei niederer artikulation. Zahntech. Rundschau, Berl., 1898, 4557.—**Brown** (G. V. I.) Meeting of the American Medical Association. Dental Digest, Chicago, 1898, iv, 377-383.—**Bull** (C. S.) The connection between diseases of the eye and diseases of the teeth. Dental Rec., Lond., 1898, xviii, 329-344.—**Carrillo** (A.) Patologia dental hidrargiricosifilitica. [Extr.] Rev. dental amer., Phila., 1898, vi, 101-105.—**Castex**. Sur la région sous-glottique (anatomie et pathologie). Arch. internat. de laryngol. [etc.], Par., 1898, xi, 301-303.—**Chupein** (T. F.) The construction of crown and bridge work. Dental Office and Lab., Phila., 1898, xii, 97-103.—**Cigrand** (B. J.) Use of an intradental band. Dental Digest, Chicago, 1898, iv, 369-377.—**Clements** (G. B.) The extraction of teeth. Dental Headlight, Nashville, 1898, xix, 105-110.—**Coleman** (A.) On a method of prolonging anæsthesia in operations in the mouth. Brit. J. Dent. Sc., Lond., 1898, xli, 529-532.—**Collet**. Examen du larynx dans un cas de paralysie glosso-labiée. Rev. internat. de rhinol., otol. et laryngol., Par., 1898, viii, 603-605.—**Cook** (G. W.) The effect of heat on dentine. Indiana Dent. J., Indianap., 1898, i, 631.—**Cooper** (C. F.) The senses in dental diagnosis. Ohio Dent. J., Toledo, 1898 xviii, 318-323.—**Cormany** (J. W.) Where shall I locate? or the beauties of a country practice. Dental Rev., Chicago, 1898, xii, 500-504.—**Cox** (C. N.) Chronic inflammation of the pharyngeal tonsil, with little hypertrophy. Ann. Otol., Rhinol. and Laryngol., St. Louis, 1898, vii, 253-255.—**Cox** (R. P.) Hemorrhage following removal of the third tonsil. Atlanta M. and S. J., 1898-9, n. s., xv, 170-174.—**Curtis** (G. L.) Case of reproduction of tissue. Dental Digest, Chicago, 1898, iv, 301-303.—**Custer** (L. E.) A new process of fusing platinum. Dental Rev., Chicago, 1898, xii, 504-507.—**Davenport** (K. A.) Porcelain inlays by the method introduced by Dr. N. S. Jenkins, of Dresden. J. Brit. Dent. Ass., Lond., 1898, xix, 446.—**Deady** (C.) Two cases of mastoid disease. J. Ophth., Otol. and Laryngol., N. Y., 1898, x, 152-156.—**Dench** (E. B.) The technique of the mastoid operation. *Ibid*: 125-145.—**Desarrollo** (El) de los dientes y sus alveolos. Rev. dental amer., Phila., 1898, vi, 106-111.—**von Dobrzyniecki** (A. R.) Beiträge zur Bakteriologie der Zahncaries. Centralbl. f. Bakteriol. [etc.], 1. abt., Jena, 1898, xxiii, 976-979.—**Dryer** (J. L.) Some overlooked sources of infection, notably circulating libraries, careless dental surgery and unclean barbering. Tr. M. Soc. Calif., 1898, xxviii, 96-101.—**Dubar**. Ostéopériostite nécrosique du maxillaire inférieur par infection salivaire. Echo méd. du nord, Lille, 1898, ii, 279-282.—**Duncan** (T.) A propos de la cataphorèse. Rev. odont., Par., 1898, xvii, 256-260.—**Escat** (E.) Rapport sur la pathologie de l'amygdale linguale. Ann. d. mal. de l'oreille, du larynx [etc.], Par., 1898, xxiv, 602-609. ——— *Also:* Arch. internat. de laryngol. [etc.], Par., 1898, xi, 281-291.—**Felix** (G.) Die Zahnextraktion bei schwangeren Frauen. Zahnärztl. Wochenbl., Hamb., 1898, xi, 407.—**Floris** (H.) Ueber die schwerfliessende Emaillen. J. f. Zahnheilk., Berl., 1898, xiii, no. 23.—**Folet** (H.) La déambulation des fractures de jambe. Echo méd. du nord, Lille, 1898, ii, 282-284.—**Friedrich** (P. L.) Zur chirurgischen Behandlung der Gesichtsneuralgie, einsohlieslich der Resektion und Exstirpation des Ganglion Gasseri. Mitt. a. d. Grenzgeb. d. med. u. Chir., Jena, 1898, iii, 340-364.—**Gage** (Arthur R.) [1857-1898.] (Obituary.)

Dental Cosmos, Phila., 1898, xl, 599.—**Galloway** (W. C.) Follicular pharyngitis. Atlanta M. and S. J., 1898–9, n. s., xv, 235–237.—**Gartrell** (J. H.) Gold linings and strengtheners for vulcanite plates. J. Brit. Dent. Ass., Lond., 1898, xix, 460–464.—**Gastou et Haury**. Papillome mugueux bénin de la lèvre inférieure (lymphangiectasie circonscrite œdémateuse. Ann. de dermat. et syph., Par., 1898, 3. s., ix, 558.—**Gaudier** (H.) Un cas d'empyème du sinus maxillaire de nature tuberculeuse; intervention par la fosse canine; guérison. Rev. internat. de rhinol., otol. et laryngol., Par., 1898, viii, 599–602.—**Geiger**. Modo di riprodurre le pieghe palatine, e dare lla placca une spessore uniforme nella protesi in caoutchouc. Gior. di corrisp. p. dentisti, Milano, 1898, xxvii, 135–138.—**Gevaert** (C.) Considérations sur les papillomes du larynx. Belgique méd., Gand-Haarlem, 1898, i, 774–783.—**Gevaert** (G.) Tumeur de la langue chez un enfant de trois mois. Clinique, Brux., 1898, xii, 401–403.—**Goldsmith** (S. L.) Simplex electrodes. Items Interest, N. Y., 1898, xx, 487.—**Good** (P.) Deux cas de papillomes du voile du palais. Rev. internat. de rhinol., otol. et laryngol., Par., 1898, viii, 605–609.—**Goodale** (J. L.) The histology of hyperkeratosis lingualis. J. Bost. Soc. M. Sc., 1897–8, ii, 204–209.—**Grady** (R.) Dental faculties in medical schools. Dental Reg., Cincin., 1898, lii, 264–266.—**Graberg** (J.) Beiträge zur Genese des Geschmackorgans des Menschens. Morphol. Arb., Jena, 1898, viii, 117–134, 2 pl.—**Hallock** (F. K.) Angioneurotic edema of the tongue, Atlantic M. Weekly, Providence, 1898, x, 33–36.—**Harlan** (A. W.) Pyorrhea alveolaris; with some notes from the practice of the author. Dental Cosmos, Phila., 1898, xl, 543–547.—**Heymann** (P.) Traitement arsenical du sarcome des amygdales. Arch. internat. de laryngol. [etc.], Par., 1898, xi, 203.—**Horton** (E. G.) Formaldehyd as a practical disinfectant for instruments. Dental Cosmos, Phila., 1898, xl, 537–542.—**Howe** (J. M.) Secrets and patents *versus* professional progress. Internat. Dent. J., Phila., 1898, xix, 413–426.—**Hugues** (P.) Des abcès chroniques des amygdales. Rev. internat. de rhinol., otol. et laryngol., Par., 1898, viii, 609–614.—**Jack** (L.) What should be the character and policy of dental journalism? Internat. Dent. J., Phila., 1898, xix, 426–432.—**Jameson** (A.) Suggestion as a factor in controlling patients during dental operations. Indiana Dent. J., Indianap., 1898, i, 629–631.—**Johnson** (G. E.) Physiological antagonism. *Ibid:* 651–655.—**Johnson** (H. H.) Trigeminous reflexes. Dental Reg., Cincin., 1898, lii, 267–269.—**Johnson** (William Lawrence.) [1826–1898.] (Obituary.) Dental Cosmos, Phila., 1898, xl, 598.—**Joscelyne** (H. P.) Notes on amalgams and osteoplastics. Brit. J. Dent. Sc., Lond., 1898, xli, 577–587.—**Jung**. Di un perfezionamento negli otturatori. Gior. di corrisp. p. dentisti, Milano, 1898, xxvii, 131–135.—**Keberlet** (R.) Die Ergebnisse der Untersuchung des Kauapparates von 2200 Schulkindern. Zahnärztl. Rundschau, Berl., 1898, vii, 4531.—**Lamb** (D. S.) Bilateral anchylosis of the jaws. Tr. M. Soc. Dist. Columb. (1897), 1898, ii, 33.—**Lindemann** (W.) Ueber die Wirkung der Aetherinhalation auf die Lungen. Centralbl. f. allg. Path. u. path. Anat., Jena, 1898, ix, 442–449.—**Lohmann** (A.) Ueber Kieferbrüche. Zahnärztl. Rundschau, Berl., 1898, vii, 4617.—**Luc**. Traitement de la sinusite maxillaire. Ann. d. mal. de l'oreille, du larynx [etc.], Par., 1898, xxiv, 609–611. ——— Résultat d'une statistique de vingt cas d'empyème chronique du sinus maxillaire opérés suivant mon nouveau procédé. Arch. internat. de laryngol. [etc.], Par., 1898, xi, 205–263 [Discussion], 291.—**Luckie** (S. B.) Oxide of zinc and eugenol. Items Interest, N. Y., 1898, xx, 490.—**M'Lean** (W. T.) Destruction of pulp and gold crown by mercuric action within amalgam. Ohio Dent. J., Toledo, 1898, xviii, 313.—**Mackenzie** (F.) A few little tips in dentistry. Brit. J. Dent. Sc., Lond., 1898, xli, 533–542.—**Mahoney** (J.) Bites and some methods of taking them. Am. Dent. Weekly, Atlanta, 1898, i, 545–548. ——— *Also:* Brit. J. Dent. Sc., Lond., 1898, xli, 588–596.—**Meek** (R. W.) Some practical suggestions. Pacific Med.-Dent. Gaz., San Fran., 1898, vi, 264–267.—**Mignon**. Mal perforant buccal. Bull. Soc. anat. de Par., 1898, lxxiii, 308.—**Moure**. Cancer du larynx; thyrotomie. Arch. internat. de laryngol. [etc.], Par., 1898, xi, 298–301. ——— Cancer du larynx et thyrotomie. Ann. d. mal. de l'oreille, du larynx [etc.], Par., 1898, xxiv, 613–615.—**Muller** (E.) Goldkronen, Kapselstiftzähne und abnehmbare Brückenarbeiten. Zahntech. Rundschau, Berl., 1898, 4555; 4617.—**Neisse** (R.) Ueber den Einschluss von Parotisläppchen in Lymphknoten. Anat. Hefte, Wiesb., 1898, x, 287–306, 2 pl.—**Noel** (L. G.) Silver nitrate in the treatment of pulpless teeth. Dental Headlight, Nashville, 1898, xix, 103–105.—**Osborn** (H. F.) Homologies and nomenclature of the elements of the molar teeth. Proc. Am. Ass. Adv. Sc., 1897, Salem, 1898, xlvi, 238.—**Owen** (J.) A series of four cases of swallowing artificial teeth treated in Royal Southern Hospital, Liverpool, during the last six months. J. Brit. Dent. Ass., Lond., 1898, xix, 467–469.—**Palmer** (C. M.) The antrum of Highmore. Items Interest, N. Y., 1898, xx, 496–500.—**Palmer** (S. B.) Gingivitis and its relation to crown work. Dental Digest, Chicago, 1898, iv, 303–310.—**Phillips** (W. C.) Primary epithelioma of the antrum of Highmore, with history of a case. Ann. Otol., Rhinol. and Laryngol., St. Louis, 1898, vii, 271–273.—**Pitsch**. Ueber das Formol und sein Polymeron, das Trioxmethylen. Ihre Anwendung in der operativen Zahnheilkunde und zur Sterilisation der Instrumente. Zahnärztl.

Wochenbl., Hamb., 1898, xi, 405–407.——— *Also, transl.:* Odontologie, Par., 1898, 2. s. vi, 430–439.—**Port.** Ueber die Behandlung der Zahnkrankheiten durch den praktischen Arzt. Deutsche Prax., München, 1898, i, 165–170. ——— Ein neues Unterrichtsmodel für Brückenarbeiten. Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 292.—**Potter** (W. H.) Independent journalism. Internat. Dent. J., Phila., 1898, xix, 433–438.—**Poulson** (F. M.) Method of backing teeth. Dental Digest, Chicago, 1898, iv, 383.—**Preston** (A. E.) Aluminum crowns. Dental Cosmos, Phila., 1898, xl, 550–552.—**Prinz** (H.) Formaldehyde; its use in dentistry. Dental Rev., Chicago, 1898, xii, 507–513.—**Prota** (G.) **e G. Martuscelli.** Sarcoma della tonsilla linguale. Arch. ital. di laringol., Napoli, 1898, xviii, 107–121, 1 pl.—**Pruyn** (C. P.) Amalgam. Dental Rev., Chicago, 1898, xii, 493–495.—**Ritter** (P.) Contributo alla diagnosi delle malattie dell' antro. Gior. di corrisp. p. dentisti, Milano, 1898, xxvii, 128-131.—**Sanders** (J. J. H.) A simple saliva ejector. J. Brit. Dent. Ass., Lond., 1898, xix, 464–467.—**Sandusky** (F. R.) Practical application of appliances for the correction of oral deformities. Items Interest, N. Y., 1898, xx, 492–495.—**Sargnon.** Un cas d'abcès enkysté chronique de l'amygdale droite sans fistule; ouverture et destruction au galvanocautère; guérison sans récidive. Lyon méd., 1898, lxxxviii, 327–334.—**Schenk** (F.) Zur tödtlichen Nachwirkung des Chloroform. Ztschr. f. Heilk., Berl., 1898, xix, 93–111, 1 pl.—**Schmid.** La pathologie de la dent de sagesse supérieure. Progrès dent., Par., 1898, xxv, 172–181.—**Schreiber** (M.) Storia della terapia operativa del trisma mascellare. Gior. di corrisp. per dentisti, Milano, 1898, xxvii, 120–127.—**Schulz** (R.) Ricerche sulla composizione chimica dei denti umani normali di varie étà, avuto riguardo a tutte e tre le sostanze dure. *Ibid.:* 97–119.—**Schweitzer** (H.) Regulirung bei einem 28 jährigen Patienten. Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 293–302.—**Seifert** (O.) Ueber die Gewerbekrankheiten der Mundhöhle. *Ibid.:* 283–292.—**Seventh** report of the committee appointed by the Representative Board of the British Dental Association, to conduct the collective investigation as to the condition of the teeth of school children. J. Brit. Dent. Ass., Lond., 1898, xix, 452–460.—**Smith** (B. H.) Professional atmosphere and morals. Internat. Dent. J., Phila., 1898, xix, 439–445.—**Smith** (H. A.) Concerning the possibilities in the art of filling teeth. Indiana Dent. J., Indianap., 1898, i, 656–658.—**Southwick** (Alfred Porter.) [1826–1898.] (Obituary.) Dental Cosmos, Phila., 1898, xl, 597.—**Sparks** (F. M.) Anæsthesia. Indiana Dent. J., Indianap., 1898, i, 647–650.—**Stine** (D. L.) Popular dental education. *Ibid.:* 636–642.—**Suggett** (A. H.) Specialism essential to success. Pacific Med.-Dent. Gaz., San Fran., 1898, vi, 267–269.—**Texier.** Sur un cas de rétrécissement brusque de la trachée. Arch. internat. de laryngol. [etc.], Par., 1898, xi, 311.—**Thompson** (J. M.) Can pyorrhea alveolaris be cured? Dental Reg., Cincin., 1898, lii, 251–255.—**Thorne** (W. M.) Three cases of trifacial neuralgia of dental origin unaccompanied by toothache. Occidental M. Times, Sacramento, 1898, xii, 229-231.—**Trueman** (W. H.) Prophylactic dentistry a century and a half ago. Dental Pract., Buffalo, 1898, xxix, 97–103.—**Turner** (W. A.) The innervation of the muscles of the soft palate. Laryngoscope, St. Louis, 1898, v, 33–36.—**Underwood** (A. S.) A new factor in erosion. J. Brit. Dent. Ass., Lond., 1898, xix, 470–472.—**Ward** (C. H.) A cranio-mandibular index. Proc. Ass. Am. Anat. 1897, Wash., 1898, x, 97–106.—**Wasser** (G. N.) The care of children's teeth. Ohio Dent. J., Toledo, 1898, xviii, 323–326.—**Watkins** (S. C. G.) Ueber Xeroform. J. f. Zahnheilk., Berl., 1898, xiii, no. 22.—**Weller** (H. D.) Neuralgia of the face and eyes. Indiana Dent. J., Indianap., 1898, i, 634.—**Whipple** (J. W.) Double resection of the inferior maxilla for protruding lower jaw. Dental Cosmos, Phila., 1898, xl, 552–557.—**Williams** (J. L.) On structural changes in human enamel; with special reference to clinical observations on hard and soft enamel. *Ibid.:* 505–537.—**Winkler** (S.) Elephantiasis labiorum oris. Orvosi hetil., Budapest, 1898, xlii, 332.—**York** (E. L.) Why coagulants diffuse through dentine. Dental Rev., Chicago, 1898, xii, 496–500.

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# LIST OF UNITED STATES PATENTS

## PERTAINING OR APPLICABLE TO DENTISTRY

### ISSUED DURING JULY, 1898.

*July* 5.—No. 606,781, to R. L. HALPERIN. Dental jaw brace.
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" " No. 607,823, to L. H. BERG. Vulcanizing apparatus.

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# DENTAL COSMOS.

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## ORIGINAL COMMUNICATIONS.

### THE INNERVATION OF THE TOOTH-PULP.

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IN glancing through the literature on the microscopic anatomy of the tooth, one is early impressed with the want of unanimity in the views expressed by various writers. One can hardly select a single tissue, entering into the structure of the tooth, which is not, even to-day, interpreted in one of several ways by men who have given thought to these questions. This is true of the dentin, of the pulp and odontoblasts, of the peridental membrane, and even of the enamel, and is more especially true when we come to consider the development of these structures. This, we must admit, is not due to the fact that insufficiently careful work has been done to warrant more encouraging results, but rather to the difficulty which surrounds these investigations. Indeed, it is well known that in order to obtain good sections of tooth and pulp *in situ*, either in a decalcified or undecalcified state, one must be conversant with histological methods, both difficult and tedious. It is not my purpose, however, to burden you with an account of the microscopic anatomy of the tooth as a whole, but rather to bring to your notice some observations on one of the most debatable points in tooth histology,—namely, the mode of ending of the nerves which enter the tooth-pulp: a question which, I am assured, will elicit the interest of dentists. This question is one fraught with many difficulties, and there is no wonder that it has been so variously answered by practical dentists and scientists who have attempted its elucidation. The reason that laboratory observations are so at variance is easily explained by the fact that the methods employed in the demonstration of the ultimate ending of nerves are difficult of application here, and other methods leave so much room for doubt and personal equation that not much credence can be placed in the results given. Our knowledge of the nerve endings, both sensory and motor, has in recent years been greatly advanced by the more general introduction of two staining methods, the Golgi chrome-silver method and the Ehrlich methylen-blue method. The value of these methods is found in the fact that in successfully stained preparations the nerve-fibers, to their finest terminations, are differentially stained, and may therefore be distinguished from the other tissues. Nearly all nerve-endings have been stained with one or the other, or in many cases with both of these methods, and much new light has been thrown on their finer structure and their relation to other elements. It has long been the hope of a number of investigators that these methods might be successfully employed in the study of the nerves of the tooth-pulp. Such attempts have, as a general rule, given only negative results. Recently, however, Retzius has been able to stain the pulp-nerves after the Golgi method, and my own observations are based on successfully stained methylen-blue preparations. Before giving, however, these observations, I deem it profitable to review briefly the results obtained by other writers on this subject. The first authentic reference to an observation on the mode of ending of the pulp-nerves which I have been able to find is that given by Boll in 1868. His observations were made on the pulps removed from the canines of young rabbits and Guinea-pigs, some of which were stained in gold chlorid; others were fixed for a short time in a dilute chromic acid solution, and teased and mounted in this solution. With the former method his results were negative; in preparations prepared after the latter method he was able to make out numerous medullated and non-medullated nerve-fibers in the tooth-pulp. Under the odontoblasts there was observed an especially dense layer or network of non-medullated nerve-fibers. From this network he was able to trace fine fibrillæ between the odontoblasts, some of which were traced for a considerable distance beyond this cell layer. He was never able to follow such fibrils into the dentinal tubules, but regards such a distribution as certain, even though the proof was lacking. He assumes that in the dentin there are found two kinds of tubules,—such as contain the dentinal fibers and such as contain the nerve-fibers. Although repeated attempts have been made to corroborate Boll's observations, they have thus far not been confirmed by other investigators. I shall refer to them again at a later time.

Much more elaborate endings of pulp-nerves in the dentin and the enamel have been mentioned in some recent papers by Morgenstern. He describes bundles of axis-cylinders, surrounded by thin medullary sheaths, which run into the dentin at certain well-defined places. These nerves are said to run through the dentin in tubules, some of which are smaller than the dentinal tubules, while others are larger. These tubules, he states, can be distinguished from the ordinary dentinal tubules by the ordinary methods of research. Each canal is said to contain at least two axis-cylinders, which, when they reach the periphery of the dentin, terminate here or in the boundary line between the dentin and the enamel, or dentin and cementum, or in the enamel. In the dentin and in the stratum intermedium the axis-cylinders terminate in knob-shaped structures, which are ellipsoid or pear-shaped. In the enamel they end in various ways. They penetrate it for a short distance and end as in the dentin. They end in long-drawn-out nucleated structures, in which the nerve ends in one of the following ways:

(*a*) The axis-cylinder may pass through the entire nerve-corpuscle to terminate in its periphery.

(*b*) The axis-cylinder may terminate on a nucleus of the nerve-corpuscle.

(*c*) The axis-cylinder may pass through the entire nerve-corpuscle, winding itself around one or several nuclei, to end on the last nucleus of the so-called corpuscle.

These nerve-corpuscles are most fully developed in the bicuspids and in the molars. In the former they are found particularly in the cusps, in the latter by the side of the cusps. In a later paper Morgenstern again draws attention to these observations, giving also an account of the method by which these results were obtained. Morgenstern's observations have already been discussed by Röse and Tomes. The former repeated Morgenstern's methods and reached the conclusion that his end corpuscles are only areas of uncalcified ground substances, through which pass the dentinal fibers. Röse refers, in this connection, to observations made by Walkhoff, who regards the interglobular spaces, the granular layer, and the club-shaped processes as morphologically similar structures. They consist, Walkhoff thinks, of uncalcified ground substance, pierced by dentinal tubules, and are a sign of altered functional activity during the development of these structures. The club-shaped process extends up into the enamel, sometimes in line with the enamel-prisms, sometimes at an angle to them. Morgenstern must have observed such structures and looked upon them as nerve-corpuscles. Tomes very correctly states that "it seems unlikely if there are in the dentin special canals, some smaller and some larger than the dentinal tubules, that these should not have been noticed. The dentinal tubules being remarkable for their uniformity of diameter, then, too, these end corpuscles must have occupied spaces which would be conspicuous in dry dentin sections." That medullated nerve-fibers should pass beyond the odontoblasts into the dentin seems to me very improbable, as such nerves might easily be detected in ordinary teased preparations, certainly in those stained with osmic acid. It would seem quite clear then that Morgenstern must have been in error, and must have misinterpreted the preparations made by himself. Another observation which might be used to demonstrate the entrance of pulp-nerves into the dentin, although this is not definitely stated, is that given by Tomes, who mentions some investigations made by Mummery. At the time the following was written the research was not completed. If it has appeared since then, I have not been able to find it. The observations referred to are as follows: "By following Boll's method of preparation, by Weil's process, and also by decalcification processes, he (Mummery) has convinced himself and others that a great number of fibers pass from the pulp to the dentin, these fibers being much smaller than the dentin fibers properly so-called. The accuracy of Boll's results is, therefore, so far confirmed. He has not, however, fully succeeded in seeing what becomes of them when they reach the dentin. By means of various stains, especially by means of iron, followed by tannin, he has shown them stained, and they appear to be traceable backward into nerve trunks a little below the surface; these trunks consist of sheaves of non-medullated nerve-fibers,—axis-cylinders in fact. Mummery entertains no doubt that the dentin is permeated by dentinal fibers, but also by much finer fibers, some of which run up toward it from fusiform cells, which lie near the surface of the pulp, and others appear to come from points deeper down in the pulp, and to be without fusiform enlargements." The authorities quoted thus far all refer to the fact that their observations explain very readily the sensitiveness of the dentin. This would no doubt be the case if the presence of nerves in the dentin were clearly proven. It may, however, have been observed that in Boll's and Mummery's account the conclusions rest largely on hypothetical data, and that Morgenstern's results may be attacked from various points. The majority of investigators who have especially considered this question have reached the conclusion that the pulp-nerves are connected directly or indirectly with the odontoblasts. Many of these observers state, with more or less positiveness, that the terminal nerve-fibrils become continuous with the pulpal processes of the odontoblasts, or with cells or fibers under this layer, through which such connection is made. And here we are again confronted with a variety of views.

White states, "I should not be far from the truth were I to assert that these fibers, after leaving the bases of the germinal corpuscles, enter the fibrous tissue of the pulp and become fused in the outer coat of the nerve; but I would have you remember that it is only conjecture after all, and that preparations in which this connection is demonstrated have to be yet worked out." Coleman, in the discussion which followed White's paper, states that he is inclined to regard the odontoblasts as comparable to the tactile corpuscles, Pacinian bodies, the rods and cones of the retina, and the termination of the auditory nerves in the cochlea. Coleman believes that a connection exists between the odontoblasts and the nerve-fibers, but does not consider it as absolutely necessary to make out such a connection between the nerve-fibers and the sensitive part. "The impression received by the long processes of the odontoblasts might be conducted from these bodies through numerous cells which intervene between them and the nerve-fibers, or possibly the connective tissue of the pulp may perform this office."

Hopewell Smith sees a marked analogy between the odontoblasts and certain epithelioid cells found in the olfactory region of man and certain animals, and the auditory cells of the *macula lutea* of the membranous labyrinth. But as the olfactory cells are known to be peripheral nerve cells, with axis-cylinders which terminate in the olfactory bulb, and as the auditory or hair cells of the macula are neuro-epithelial, and probably surrounded with the free endings of nerve-fibers, as is the case for the hair cells of the cochlea, and, further, as the odontoblasts are differentiated connective-tissue cells, of mesoblastic origin, while the cells above referred to are of epiblastic origin, a point which Smith seems to recognize, the analogy drawn by him seems to me somewhat unfortunate. Smith was not able to trace the central process of the odontoblasts to nerve-fibers, yet he thinks there can be no doubt that they are continuous. This connection, if I read him correctly, is made in the following manner: The basal layer of Weil, he states, is found in the portion of the tooth most sentient. "This layer consists of fine fibers, which extend deeply into the pulp on the one hand and into the basal cells of the odontoblasts on the other. The inference, therefore. theoretically and logically speaking, is that the fibers of Weil's layer are non-medullated nerve-fibers." Smith regards the odontoblasts as transmitters of the sensory impulses; they are, he states, "more intimately connected with the nervous system than has hitherto been supposed, and they must be the actual end organs or the dental ganglia of the nerves of the pulp." It should be stated that he does not look upon the odontoblasts as the cells instrumental in the formation of the dentin; this function is ascribed to other cells of the pulp. The term odontoblasts he regards, therefore, as a misnomer.

The observations of Legros and Magitot are also in line with those above quoted. They examined the pulp of teeth of the dog, cat, and calf, and more especially with the gold chlorid method. They find the terminal nerve-filaments continuous with cells found just below the odontoblasts, which cells are intermediary between the nerve-fibers and the odontoblasts.

They also called to their aid comparative histology, drawing an analogy between the olfactory cells, which are known to be continuous with nerve-fibers, and the odontoblasts. Sudduth accepts the observations of Magitot,—namely, that the terminal fibrils unite with the odontoblasts, and that sensation is thus transmitted by the dentinal fibers to the terminal branches of the nerves. Robertson has described the nerves of the tooth-pulp of the ox. Specimens were prepared by fixing and teasing in osmic acid. The conclusion was reached that the axis-cylinders of the medullated nerves lose their medullary sheath, and after running a greater or less distance they become continuous with the pulp processes of the odontoblasts, which therefore, with their dentinal processes, become nerve-end organs. I may here also refer to Bödecker's observations, although they differ somewhat from the ones just quoted. And that I may not misinterpret his remarks, I here make use of his own words: "In specimens of nine-month fetal pulp, sufficiently stained with gold chlorid, I have observed that the medullated nerve-fibers upon approaching the periphery of the pulp are destitute of their myelin sheath, and now being bare axis-cylinders, split up into numerous extremely delicate beaded fibrillæ, —the 'axis-fibrillæ.' They are marked by a dark violet color, and run in the light rims between the rows of the odontoblasts, near the pulp-tissue proper, and are connected with the odontoblasts by means of conical offshoots. In some instances I have observed that these axis-fibrillæ terminate in knob-like extremities. But whether the nerve-fibers directly anastomose with the dentinal fibers I am unable to say. That an indirect connection of the two is established by the intervening reticulum of living matter I positively assert." In explanation of the above statement, it should be said that Bödecker believes the odontoblasts to furnish the basis substance of the dentin, whereas the dentinal fibers, being formations of living matter, originate between the odontoblasts. The nerve-fibers are thus brought into relation with the dentinal fibers through the reticulum supposed to exist between the odontoblasts. These views are all so heterodox, so at variance with the more generally accepted ideas of the structure of the odontoblasts and the dentinal fibers, that much more convincing proof than has hitherto been given by their upholders will be demanded before they are generally accepted. Bödecker's observations on the ending of the pulp-nerves are so colored by his views of the structure of the pulp, odontoblasts, and dentin—which views I cannot accept—that a discussion of his observations on the pulp-nerves seems uncalled for.

I have thus fully reviewed the observations and conclusions of writers who believe in a continuity between the odontoblasts and the nerves of the pulp because, as far as I am able to ascertain, they voice the opinions more generally held at the present time. In answer to these observations, certain general considerations may not be out of place. In the first place, it must be borne in mind that the odontoblasts are differentiated connective-tissue cells of mesoblastic origin. It is assumed by the above writers that these connective-tissue cells perceive, originate, or at least transmit impressions or stimuli, which become sensations when transferred to the pulp-nerves. Assuming that the nerves of the pulp are connected with the odontoblasts, we would have here a physiological phenomenon without parallel in nerve physiology. Secondly, I recall no instance where it is clearly shown that a sensory nerve-fiber becomes continuous with any kind of cell, either its body, nucleus, or any of its branches, excepting, of course, the cell body of the neuron of which said sensory fiber is a part. Such views were formerly held in certain quarters, but the Golgi and methylen-blue methods have taught us that the peripheral process of a sensory cell, that is, its dendrite, always terminates without making direct connection with any cellular element, either in what is known as a free sensory ending, where the end-brush usually covers a relatively large area, or in a special sense-organ, where the fibrils of the end-brush may be variously twisted or interlaced, and surrounded by a capsule of fibrous tissue or inclosed in an epithelial structure. To reiterate, all observations of recent times show that the end fibrils of sensory nerves terminate between the cellular elements of the tissue in which they end. These considerations, it seems to me, warrant the theoretical conclusion that the pulp-nerves are not directly connected with the odontoblasts or with any other of the pulp-cells. I shall endeavor in the remaining portion of this paper to show that observations made with the special nerve stains—Golgi method and the methylen-blue method—support this theoretical conclusion.

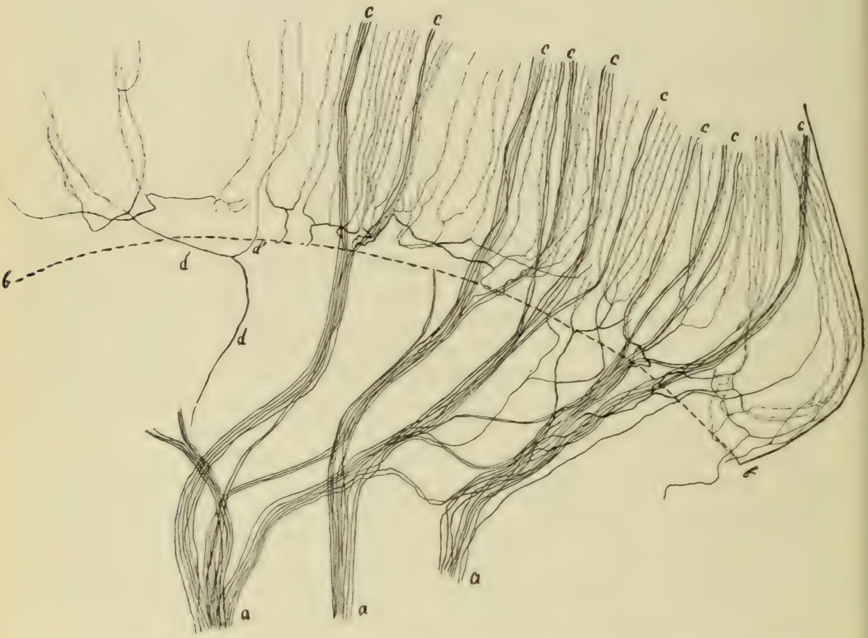
A number of investigators seem to have tried the Golgi method in the study of this problem. Röse mentions having used it, though without success. Dr. Van Deman a number of years ago did some work under my direction on the innervation of the tooth-pulp, in the histological laboratory of the University of Michigan. Among the methods used by him, the chrome-silver method was one. The results obtained at that time did not seem to us in advance of what had been known before. Retzius, however, has been more fortunate, and as his observations—three papers—appear in a publication not generally accessible, I shall take the liberty to quote them quite fully. In his first paper Retzius deals with the ending of the pulp-nerves in fishes and reptiles. *(Eel, Gobius, Gasterosteus,* and *Lacerta agilis.)* In fishes the pulp-nerves ascend from the nerve plexus under the tooth, and while undergoing repeated dichotomous division pass up immediately under the dentin and terminate in fine fibrils under the dentin. In a longitudinal section of the tooth of a lizard he observed a bundle of nerve-fibers ascending in the pulp with a blood-vessel. This nerve bundle, in its course through the pulp, was seen to give off side branches, which passed toward the sides of the pulp and toward its upper end. Fibers from such branches were traced through the odontoblast layer to the free surface of the pulp. No nerve-fibers were traced into the dentinal tubules. In his second paper he deals with the ending of pulp-nerves in amphibia (larva of *Salamandra maculata,* and *Triton cristatus).* Here also the pulp-nerves, after repeated dichotomous division, terminate in fine varicose fibrillæ in the neighborhood of the dentin, often immediately under it, never in the dentin. In his third paper he treats of the ending of the pulp-nerves in mammalia. Successful preparations were obtained with the Golgi method from the teeth of young mice. In these preparations the nerves following the blood-vessels were well stained; from them varicose branches were traced to the odontoblast zone, and between the odontoblasts. Such varicose fibrils were often traced to the free surface of the pulp, and now and then seen running tangentially between the odontoblasts and the dentin. No nerve-fibers were traced into the dentinal tubules. The investigations made by this Swedish savant must be given due consideration, embracing as they do observations on examples from the different vertebrate classes. Retzius describes here a free ending of the pulp-nerves between the odontoblasts, and between these cells and the dentin.

In my own investigations the pulps of the lower canines and molars of dogs, cats, and rabbits were used, and in all I was able to stain the nerves. After some time, however, it was found that the pulp-nerves were more readily stained in the rabbit, consequently my later observations were confined to this animal, and largely to the pulps of the lower molars. In these teeth the pulp consists of two processes almost completely separated, in fact united only by the lower portion of the peridental membrane. By cutting away the thin layer of dentin from the anterior and posterior surfaces of one of the molars, the pulp may readily be removed by inserting a fine needle under one of the processes of the pulp and making some slight traction. The pulps removed in this way were found hardly crushed or lacerated. Indeed, I have often satisfied myself, both in sections and surface preparations, that pulps may be removed in this way from the molars of the rabbit with the greater portion of the odontoblast layer in place.

The staining method employed in this investigation is, as already stated, the *intra vitam* methylen-blue method. Ehrlich showed a number of years ago that by the injection of a solution of methylen-blue in normal salt into the vessels of a narcotized animal a stain of the peripheral nerves could be attained. This method, variously modified, is now very generally used in investigations on the peripheral nervous system. In the present research its application was as follows: A dog, cat, or rabbit was killed with chloroform, and as soon as death ensued the carotid on one side was exposed and a canula inserted. Through the canula there was injected enough of a one per cent. methylen-blue solution, made up in normal salt solution, to cause the tongue and lips to assume a deep blue color. Ten to twenty c.cm., depending on the size of the animal, are required. About thirty minutes after the injection of the methylen-blue the lower jaw was removed and cleansed by wiping with a dry cloth. The jaw was then broken open with bone forceps or a strong knife, and the teeth removed, care being taken not to injure the pulp. The pulps were removed as above described, and placed at once on a slide moistened with normal salt solution. In a few moments the characteristic blue color was found to develop in the axis-cylinders of the pulp-nerves. Such pulps were then examined from time to time, until it was thought the nerves were stained as well as might be hoped for in the particular preparation under examination. In fresh preparations thus obtained the axis-cylinders of the nerves are stained deeply blue, the other tissues not at all or only faintly blue. Unfortunately, preparations prepared after this method fade very readily unless fixed at once, and always lose somewhat in color when fixed. As fixatives I used a saturated aqueous solution of ammonium picrate (Dogiel) or a solution of ammonium molybdate (Bethe). The former preparations are mounted in a mixture of glycerol and the ammonium picrate solution, the latter dehydrated and mounted in balsam. After the use of either method the tissues become so clear that a small tooth-pulp may be examined *in toto*. It was found, however, advantageous to divide the pulps in two or three longitudinal sections before mounting. This was done by placing the pulps between two flat pieces of elder-pith and cutting down between them with a sharp microtome knife. In this seemingly rough way I was often able to obtain good longitudinal sections of a pulp, thin enough to study under the one-twelfth inch oil immersion. Some of the stained tissues were imbedded in paraffin, and cut serially in longitudinal and cross sections, although it was found that somewhat thicker free-hand sections answered the purpose equally well, in fact may be said to have been more serviceable, as in them the general distribution of the nerves, as well as their finer endings, could be made out, while in sections it was possible to obtain only short segments of the stained nerves. In all nearly one hundred well-stained pulps were studied; of these the ones taken from the molars of rabbits gave the clearest pictures, and my account is based largely on such preparations. They will, however, as far as I have been able to determine, apply equally well to the pulp-nerves of the other mammals investigated, and probably also to the nerves in the tooth-pulp of man, although these were not investigated. It is hardly necessary to state that the methylen-blue method, as above described, cannot be employed in the study of the pulp-nerves of human teeth. Some of the modifications of this method which might have been used were not tried, owing to the negative results obtained in animals. I refer here particularly to a method suggested by Dogiel. where the fresh tissues are placed at once in a very dilute solution of methylen-blue in normal salt (1-20 per cent.). This method gave, however, no results, the pulp-tissues staining so early and so deeply that what nerves may have been stained were not recognized. I have given this somewhat lengthy description of the methylen-blue method under the impression that many of my readers were not familiar with its details; we may now turn to the results obtained.

The nerve-fibers going to the pulp are, as is well known, medullated fibers. They approach the lower portion of the pulp in one or several relatively large nerve-bundles. On reaching the lower surface of the pulps these larger nerve-bundles break up into numerous smaller ones, these consisting on the average of eight to ten nerve-fibers, although larger ones—fifteen to twenty fibers, and smaller ones, two to three fibers—are frequently met with. In the fibrous tissue membrane, which covers the under surface of the pulp, and which is continuous with the peridental membrane, these smaller nerve-bundles form, as the result of frequent anastomosis, a plexus of medullated fibers. In Fig. 1, which represents a portion of the lower end of a tooth-pulp, stained in methylen-blue, removed from the molar of a rabbit, a portion of the plexus formed by the medullated nerves entering the pulp is shown. As may be seen in this figure, the three bundles of nerves marked *a*—which, as should be stated, are branches of a larger nerve-bundle—branch and anastomose as they approach the pulp, resulting in a number of smaller bundles. The dotted line seen in the figure and marked *b* indicates the lower border of the odontoblast layer, readily recognized by their staining somewhat more deeply than other connective-tissue structures of the pulp. This figure shows clearly another point, which has been observed in nearly all well-stained preparations, and to which attention has hitherto not been called. The smaller bundles of medullated nerves, coming off from the plexus above described, pass nearly perpendicularly up into the pulp, into which they may be traced as small bundles of medullated nerves, two to eight or ten in number, to all levels of the pulp, some of them to the very tip. At the upper border of the figure these bundles of medullated fibers are designated by the letter *c*. These are the nerve-fibers usually referred to in describing the pulp-nerves; their mode of termination will be considered somewhat later. Not all nerve-fibers terminating in the pulp are found in the small bundles of medullated fibers above referred to. As is shown in this figure, many medullated fibers leave the nerve-bundles and approach the surface of the pulp near the lower edge of the odontoblast layer. One such fiber is sketched by itself at the left of the figure. This fiber *(d)* divides just below the odontoblast layer into a medullated branch *d'* and a non-medullated branch *d''*. The medullated branch divides just above the lower border of the odontoblast layer into four non-medullated branches, some of which undergo further division. The figure shows many such fibers, which, as they approach the lower edge of the odontoblast layer, lose their medullary sheath and break up into numerous non-medullated branches. These non-medullated branches, as I have repeatedly been able to observe, pass up into the pulp immediately under the layer of odontoblasts, having a very regular, almost straight course. That they are non-medullated fibers is

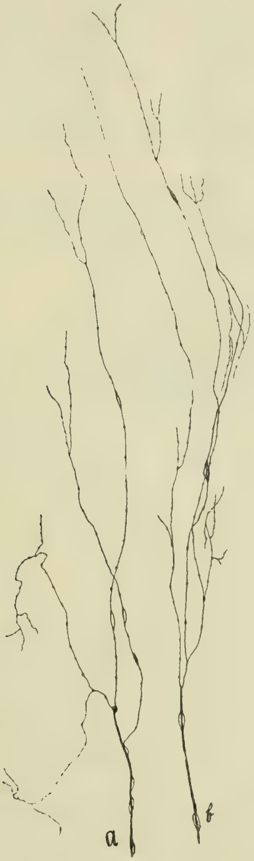
FIG. 1.



readily made out by their varicosity. In surface preparation many such varicose, non-medullated fibers, having nearly a parallel course, may be traced nearly to the middle of the pulp, branching here and there at very acute angles. Their ultimate ending will be considered at another place.

Your attention is now again drawn to the medullated fibers which ascend in the substance of the pulp. In preparations of the whole pulp, cleared so as to be quite transparent, it may be observed that medullated fibers, or small bundles consisting of two or three such fibers, from place to place become separated from the larger bundles found in the substance of the pulp and wend their way toward its surface. Such small bundles often anastomose by an exchange of fibers, or by a branching of the medullated nerves at the nodes of Ranvier, the respective branches participating in the formation of this plexus. On approaching the surface of the pulp the medullated fibers lose their medullary sheath; the non-medullated terminal branches, after repeated division, form a plexus immediately under the odontoblasts. In Fig. 2,

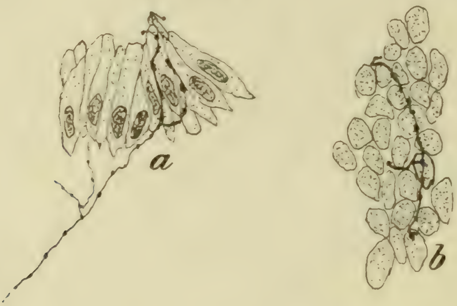
FIG. 2.



*a* and *b*, are shown two such non-medullated terminal branches, sketched from the pulp of a dog's canine. Such non-medullated branches are often beset with nuclei; they branch and rebranch into long, delicate varicose fibers, which, as this figure may serve to show, may often be followed for long distances. A plexus of non-medullated fibers under the odontoblasts was described by Boll, and since his time by many observers. This plexus is, however, not the dense plexus described by many observers, and is a plexus only in so far as that the varicose nerve-fibrils cross each other in various directions, forming thus an interlacing network. I am inclined to think that observers who have described a dense plexus of nerve-fibrils under the odontoblasts must have mistaken connective-tissue fibers and processes of pulp cells of the odontoblasts for nerve-fibers. I find no evidence, for instance, for considering Weil's layer as a layer of non-medullated fibers, as suggested by Hopewell Smith.

As to the ultimate ending of the pulp-nerves, the point most disputed, my own observations corroborate most fully those made by Retzius with the Golgi method. I find, as he did, that terminal fibrils, given off from the plexus of a varicose fiber found under the odontoblasts, pass up between these cells, to terminate usually in fine granules near the free end of the odontoblasts. Now and then some small fibril may be traced as it takes a tangential course over the free ends of the odontoblasts, as Retzius also found. The ultimate ending of the pulp-nerves is shown in Fig. 3, *a* and *b*, sketched under the one-twelfth-inch oil immersion with the aid of the camera lucida, from a methylen-blue stained pulp removed from the molar of a rabbit, fixed in ammonium molybdate, dehydrated and mounted in balsam. In *a* is shown a row of odontoblasts seen in side view. They are approached by a fine varicose nerve-fibril, two branches of which can be traced, between odontoblasts, to their free surface. In the preparation from which this sketch was made the odontoblasts were stained faintly blue, but could, however, be readily made out by cutting off somewhat the light; the nerve-fibril was stained deeply blue, and was easily traced to its termination. In *b* are shown a number of odontoblasts as seen in end view. Over these could be traced the small

FIG. 3.



nerve-fibril sketched. That this fibril was over the odontoblasts seemed quite clear. The preparation represented the outer surface of a section of a well-stained tooth-pulp, mounted so that the odontoblast layer was uppermost. By changing the focus on the field from which the sketch was made, it was determined that the nerve-fibril was over the odontoblasts. Furthermore, the upper end of the fibril (as shown in the figure) could be traced for a short distance between the odontoblasts. These observations, taken in connection with those given by Retzius, warrant, it seems to me, the statement that the terminal branches of the pulp-nerves end between the odontoblasts near their free surface, occasionally between these cells and the dentin. They do not, I believe, make any connection with the odontoblasts nor with any of the cellular elements of the pulp. And as in no instance I was able to trace any medullated fibers into the odontoblast layer, although in some of the preparations these were well stained, I cannot agree with Morgenstern when he states that such fibers pass into the dentin. Retzius found no nerve-fiber in the dentin; the preparations made with the mythylen-blue method corroborate this fact, although they are perhaps not so conclusive. Yet, in all the preparations examined by me, I was never able to trace any nerve-fibril beyond the odontoblast layer, as one might expect if the nerve-fibers extended into the dentin, in which case we might expect, I think, that on removing the pulp here and there some nerve-fibril would be pulled out of the dentin and might be observed extending beyond the odontoblast layer. In conclusion, then, it may be stated, by way of summary, that methylen-blue preparations show that the sensory fibers entering the tooth-pulp end in rather simple end-brushes consisting of long, varicose fibrillæ which are found under the odontoblasts. These terminal fibrillæ, or fine branches given off from them, terminate in free endings, between the odontoblasts or between these cells and the dentin, and are not in connection with the dentinal fibers directly or through the odontoblasts.

If, then, the nerve-fibers do not enter the dentin, and if they are not continuous with the dentinal fibers, how is it that we experience pain when the dentin is operated upon? This question has no doubt suggested itself to you. Its answer, I admit, is at best not easy. Yet there are certain considerations which may be offered in this connection.

In the first place, let me draw your attention to a fact well stated by Black,—namely, that it required the pulp and the peridental membrane to make up the sum of the sensory functions of the tooth. I have thus far made no reference to nerves of the peridental membrane. That there are nerves in this membrane there seems no doubt. Retzius, in one of his papers, refers to such nerves. I have not paid especial attention to them, although, from casual observations on methylen-blue preparations, I am convinced that there is here a field for further research. From theoretical considerations, I should say that the nerves of the peridental membrane were stimulated mechanically; that is, by pressure. The peridental membrane may thus be regarded as the organ of touch of the tooth. It is, however, not to be supposed that there are found in this membrane special tactile corpuscles. I find no evidence for this. The pulp-nerves, it seems to me, cannot be stimulated by pressure. A more correct interpretation would appear to be the one given by Black, which in substance is that the pulp-nerves manifest a decided sensibility to thermal changes; not that they readily determine degrees of temperature or distinguish between heat or cold; this they cannot do without the aid of the nerves in the lips, the gums, and possibly also the peridental membrane. If these statements are accepted it must be understood that the pulp-nerves are temperature nerves only in the sense that they are stimulated by changes in temperature, the resulting sensation being always one of pain; in the normal tooth a marked change of temperature being required to stimulate these nerves, the heat or cold being, we may assume, conducted to the underlying tissues by the hard substance of the tooth. In the diseased tooth, where the nerve-ending is in a state of irritability, we may assume that very slight changes of temperature are sufficient to stimulate the nerves. Whether in the excavation of a cavity enough heat is developed to act as a stimulus to the pulp-nerves, is purely a matter of speculation. I can imagine that such may be the case when operating on a sensitive tooth, especially when the "bur" is used. I am well aware that numerous objections may be made to such a theory, and it is offered simply as a suggestion as one of the ways in which the pulp-nerves may be stimulated. The vibrations set up in the dentin, when operating upon it, may in an irritable tooth be sufficient to stimulate the nerves found immediately under the dentin. The dentinal fibers do not, I believe, for reasons already given, convey impulses to the pulp-nerves. That, as the result of the laceration and injury which they must undergo when the dentin is operated upon, some metabolic changes may not be set up in the odontoblast, which, as I may venture to suggest, may have as a result the liberation of heat or possibly some chemical product which may stimulate the pulp-nerves terminating between them, I am not prepared to deny.

But this is not a conduction of impulses from the dentin to the pulp-nerves in the sense expressed by Coleman, Legros and Magitot, Smith, Robertson, and Bödecker. The odontoblasts are not end-organs, as some of these investigators would have us believe, but differentiated mesoblastic cells, which have for their primary function the formation of the dentin, a fact recognized by Waldeyer, and others before him, when he designated them *odontoblasts*.

In this account stress has been laid on the anatomical findings, and I believe I may say that recent investigations with the Golgi and methylen-blue methods have thrown some light on that portion of the microscopic anatomy of the tooth which deals with the pulp-nerves. This portion of my paper I trust future investigation may uphold. As to the manner in which the pulp-nerves are stimulated we can at present only theorize, and I hope that further observations may soon lead to a better understanding of this portion of the question under consideration.

### LITERATURE CONSULTED.

1886. Black. American System of Dentistry. 1886.

1868. Boll. Untersuchungen über die Zahnpulpa. *Archiv für mik. Anat.* Vol. iv.

1894. Bödecker. The Anatomy and Pathology of the Teeth. Page 253.

1871. Coleman. In the discussion of White's article. Transactions of the Odontological Society of Great Britain. Vol. iii, New Series. Page 89. 1871.

1879. Legros et E. Magitot. Morphologie du follicule dentaire chez les mammiferes. *Journal de l'Anatomie et Physiologie.* 1879.

1892. Morgenstern. Ueber das Vorkommen von Nerven in den harten Zahnsubstanzen. *Deutsche Monatschrift für Zahnheilkunde.* Vol. x, 1892. Page 436.

1895. Morgenstern. Weiteres über das Vorkommen von Nerven in den harten Zahnsubstanzen und über eine Methode sie aufzufinden und zu conservieren. *Deutsche Monatschrift für Zahnheilkunde.* Vol. xiii. 1895. Page 111.

1892. Retzius. Zur Kenntniss der Nervenendigungen in den Zähnen. *Biologische Untersuchungen.* Neue Folge iv. Page 65. 1892.

1893. Retzius. Ueber die Nervenendigungen in den Zähnen bei Amphibien. *Biologische Untersuchungen.* Neue Folge v. Page 40. 1893.

1894. Retzius. Zur Kenntniss der Endigungsweise der Nerven in den Zähnen der Saugethiere. *Biologische Untersuchungen.* Neue Folge vi. Page 40. 1894.

1891. Robertson. Trans. Royal Soc. Edinburgh. Quoted from Tomes's Manual of Dental Anatomy.

1893. Röse. Ueber die Nervenendigungen in den Zähnen. *Deutsche Monatschrift für Zahnheilkunde.* Vol. xi. 1893. Page 58.

1893. Smith. Some observations on the cellular elements of the dental pulp. *British Journal of Dental Science.* Vol. xxxvi. 1893.

1886. Sudduth. American System of Dentistry. 1886.

1892. Tomes. Notes on recent investigations upon the nerves of the pulp. *Journal of the British Dental Association.* Vol. xiii. 1892.

1894. Tomes. A Manual of Dental Anatomy. Fourth edition. 1894.

1892. Walkhoff. Neue Untersuchungen über die Pathologie des Zahnbeins. *Deutsche Monatschrift für Zahnheilkunde.* Vol. x. 1892.

1871. White. On some points in the minute anatomy of the pulp of the teeth. *Transactions of the Odontological Society of Great Britain.* Vol. iii. New Series. 1871. Page 75.

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# A FEW CONSIDERATIONS IN FILLING TEETH.

BY C. N. JOHNSON, L.D.S., D.D.S., CHICAGO, ILL.

(Continued from page 734.)

## APPROXIMAL CAVITIES IN ANTERIOR TEETH INVOLVING THE INCISAL ANGLE.

WHEN caries has progressed so far that the approximo-incisal angle is either broken down or so undermined that it is unsafe to leave it, the problem of anchorage becomes correspondingly complicated. With this angle gone and the consequent necessity for its reproduction in gold, an additional area of filling is exposed to stress tending to its dislodgment. The usual plan of anchoring these fillings has been to groove the cervical wall deeply, with additional grooves along the labial and lingual walls wherever possible, and then drill for anchorage in the incisal region between the lingual and labial plates of enamel as they approach each other near the incisal edge. (Fig. 8.)

While many fillings anchored in this manner have stood the test for years, and while there are some instances in which this is the only practical method of anchorage, it is confidently believed that for the majority of cases there is a better and safer means at hand. The limitations of this method relate to the fact that any tipping stress upon such a filling has a tendency to lift it away from its incisal anchorage, and either loosen it entirely, or so dislodge it as to cause a leak along the incisal half of its outline. (Fig. 9.)

To more securely anchor these fillings at their incisal extremities, it is recommended to create a step at right angles with the main body of the filling by cutting a groove along the incisal edge, or rather by cutting away the incisal portion of the lingual plate of enamel to a sufficient depth and length to gain strength of filling-material. The labial plate of enamel is left standing for appearance, so that while more gold is used in this kind of a filling, the excess is presented to the lingual aspect of the tooth, Fig. 10, and there is no greater exposure of gold to the labial aspect than in the ordinary contour filling. The advantage of this form of anchorage must appeal to every mechanical mind. A filling properly placed in such a cavity cannot be dislodged short of fracture of the filling or stretching of the gold from repeated impacts of the lower tooth at the point where the main body of the filling joins the step. Stress brought to bear on such a filling in the process of biting has a tendency to force the filling into the cavity instead of lifting it away, as in the usual methods of anchorage.

## Detail of Cavity Formation.

The same general plan of formation is followed in the cervical third of the cavity that was advocated for simple approximal cavities, except that the anchorages may be made deeper, and if possible broader, for the contour filling.

*The labial wall.*—This wall should be formed as nearly as possible at definite right angles with the axial wall. The creation of an angle at this point is a matter of importance in all cases where the extent of the labial wall will permit it. The direction of stress against these fillings by the lower incisors is often obliquely upward and toward the labial (Fig. 11), and the broader we can make the area of resistance to this stress the more securely will we retain the filling. The open aspect of these cavities renders the adaptation of gold into such an angle very convenient. The labial wall of the step should have the same form and same angle between it and the seat of the step or pulpal wall. This portion of the labial wall should be left as thick as possible to prevent the gold from showing through and to represent considerable strength. In those teeth where the incisal edge is so thin that there is no opportunity for leaving an adequate labial plate it may be necessary to shorten the labial wall somewhat and build the gold over it so as to expose it to view from the labial aspect. In such a procedure artistic appearance is sacrificed for safety.

In every instance where this wall is left standing, it should be beveled as illustrated in Fig. 12, and the gold built over the bevel with the greatest care. Protected in this way, it is often possible to retain this wall with safety, and thus disguise our operation to that extent.

In considering the strength of this wall an objection may be urged by some against the formation of an angle to the cavity at the junction of the labial with the other walls, on the mechanical ground that whenever a fracture occurs it is more likely to locate itself at an angle than at any other place. In view of the fact that the present system of cavity preparation involves the formation of angles at different points in the depths of cavities, it may be well to consider this matter at this time.

If we stop to study the causes of fractured walls, we shall see that they are due either to the fact that the walls have been left unprotected by gold, or that the gold has so shifted from its original position in the cavity as to bring undue stress upon the wall. If we protect the wall with gold and the gold remains firm, there will be no fracture. The question arises how to maintain the gold secure against movement. According to the most approved and logical mechanical principles, this is best solved by building it against flat walls joined by angles, rather than against circular walls joined by curves. Other things being equal, gold will shift under stress just in proportion as the base upon which it rests is rounded. It is simply the difference between attempting to roll a cube and a sphere.

FIG. 8.

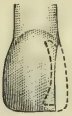


FIG. 9.

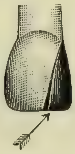


FIG. 10.

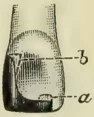


FIG. 11.

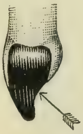
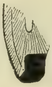


FIG. 12.



But aside from this, those who have been led to fear fractured walls on account of making angles in cavities need not hesitate on this score, because in the mouth it will be found practically impossible to form an angle so sharp or so acute that it will determine the location of a fracture,—even if a fracture should occur. The attempt to make angles insures more fully the general plan of flat surfaces, and is recommended mainly for that purpose. It is firmly believed that the ideal cavity should have flat walls joined by definite angles, forming a mortise for the filling-material, but it is exceedingly difficult to attain the ideal in the mouth.

As has already been stated, these angles should be confined to the interior of the cavity, and when the exposed outlines are formed they should be given symmetrical curves for esthetic reasons. In accord with this the margin of the labial wall of the cavities under consideration should execute a short curve from the approximal to the incisal rather than have an abrupt angle at that point. (Fig. 13.)

*The lingual wall.*—This wall should be cut freely away in the incisal region to admit of sufficient bulk of gold to represent considerable strength to the filling as the approximal joins the incisal portion. This is essentially the weak point of these fillings, any breaking or stretching of the gold resulting in a lifting away of the approximal portion of the filling.

This wall should be given some retentive form to maintain the filling against possible force from the labial aspect in the form of accidental blows. This can usually be accomplished in the cervical third of the wall and at the extremity of the step if no other opportunity presents itself. (Fig. 10, *a*, *b*.)

*The step.*—The length of the step mesio-distally must be determined by the requirements of the case. It should be extended far enough to firmly anchor the filling, and in those cases where the incisal edge of the enamel has been worn down so as to expose the dentin the step should be carried across the tooth to include all exposed dentin. It should be made sufficiently deep pulpally to admit of strength to the gold, but not far enough to endanger the pulp. Its width labio-lingually must be governed somewhat by the thickness of the tooth, and in those cases where necessary the lingual plate may be cut away freely to add to the width of the step.

FIG. 13.

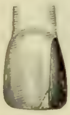


FIG. 14.

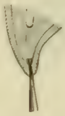
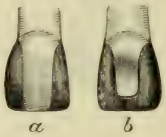


FIG. 15.



*a* *b*

The base of the step, or pulpal wall, should be made perfectly flat, and should be extended slightly into the dentin pulpally as it approaches the termination of the step. (Fig. 10, *a*.) This is to add to the security of the filling against the tipping stress. As the step terminates, it should end in an abrupt wall parallel with the long axis of the tooth and at a right angle with the pulpal wall.

*Technique.*—The same general plan of technique may be followed as was advocated for simple approximal cavities up to the formation of the step. To form the step an inverted cone bur should be placed with its side against the incisal third of the axial wall, as illustrated in Fig. 14, and carried laterally into the tissue to the extent required for the length of the step,—the cutting being done with the side of the bur. This leaves the desired flat base to the step. The projecting lingual plate of enamel left by the bur can readily be broken down with chisels.

The labial and lingual enamel-margins can best be beveled with small sandpaper disks in the engine, provided the operator studies carefully their proper use. The disk must be held at such an angle as to give a distinct bevel. Any rocking or tipping of the disk will result in a rounding of the peripheral enamel-margin, the disadvantage of which has already been mentioned. The enamel at the termination of the step can be beveled with a round bur.

### GENERAL CONSIDERATIONS.

Two items of detail must be carefully observed to make this method of cavity preparation of the highest esthetic value. The labial wall must be left as thick as possible to avoid the reflection of the gold through the enamel, and the gold must be adapted accurately to this wall throughout. If there is any failure of perfect adaptation, the filling will eventually leak at this point, giving rise to an unsightly discoloration under the enamel. The most delicate and precise placing of the gold and the highest degree of density possible are necessary for perfect results. When these are attained, it is confidently believed that this method will prove very serviceable in a certain class of cases which have in the past been troublesome to many operators.

The contraindications to this method relate to cases where the lingual wall has been extensively disintegrated by caries, thus destroying the possibility of making a step anchorage. Usually such cases involve the pulp, and wherever the pulp is removed, anchorage may be obtained if necessary by cementing an iridio-platinum post into the pulp-chamber and allowing it to extend toward the incisal portion of the cavity in such a manner that the gold can be built around it and the filling retained in position. No one method is universally applicable to these cases any more than to other cavities, and the operator who would attain the best results must carefully study each case that presents and be prepared to apply the particular method indicated in that especial case. The most that can be taught are principles and plans, and he who cannot apply his individual ingenuity to meet the requirements of special cases ought never to have been a dentist.

The question may arise with some as to the advisability of inserting these large contour fillings instead of crowning the teeth, and we see occasional doubts thrown upon contour operations since crown-work became so common. It must always remain a matter of the nicest discrimination just when to abandon filling and substitute crowning, but it may be laid down as a safe axiom that a tooth presenting sufficient material to maintain a filling for a reasonable period should be filled. Sometimes these extensive operations will last many years, and when the final crash comes and the filling is lost, the tooth presents the same opportunities for crowning that it did before it was filled. Crown-work has not yet been sufficiently long in use to determine definitely its permanence, and until we have had a more prolonged experience it may be safe to assume that in filling a doubtful tooth we extend the serviceability of that tooth just the number of years the filling lasts. In other words, the crown is likely to remain in service as many years after the filling has failed as it would have done had it been employed in the first instance. It is therefore sometimes advisable to fill these incisors, even when both mesial and distal incisal angles are gone, and to produce a filling such as is illustrated in Fig. 15, *a*, labial aspect, *b*, lingual aspect.

The objections often urged against these extensive fillings on the ground of their excessive weariness and nervous tax to the patient are rapidly being discounted by modern methods of operating, and the dental chair of to-day need not be the rack of torture that it sometimes in the past has been accounted. Filling operations by virtue of improved technique and systematic plans of procedure have been shortened nearly one-half over former days. This feature of the subject will receive more specific consideration subsequently.

(To be continued.)

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# CARIES OF AN UNERUPTED TOOTH.

BY W. D. MILLER, D.D.S., M.D., BERLIN, GERMANY.

FROM time to time we read in the dental journals of rare cases, in the domain of dental pathology, for the origin of which our generally accepted views and theories offer no satisfactory explanation.

A case of this category was described by Peirce in the DENTAL COSMOS for 1893, page 80, and as it has been cited as a proof of the untenability of the chemico-parasitical theory of caries it will be of interest to study the question more closely.

The case was that of a lady, thirty-five years of age, who suffered severely from facial neuralgia on the left side. On examination Peirce discovered a tumor, about two centimeters in diameter, just above the tuberosity. On cutting into the tumor he came upon a hard substance, which proved to be the third molar. Upon further examining the cavity he discovered and removed three supernumerary teeth. The first of these teeth had six cusps, arranged in two parallel rows, the second had only four cusps, while the third resembled a bicuspid and was only one-sixteenth of an inch in length.

"On the distal approximal surface of the second tooth was a well-marked cavity of decay, the carious action having penetrated through the enamel and well into the dentin." "The existence of true caries under these conditions," writes Peirce, "is extremely interesting from the fact that the teeth were completely covered by the soft tissues of the gums, and therefore entirely protected from any direct action of the oral fluids and food *débris*."

Peirce offers no further remarks upon this subject, but Hans Block (DENTAL COSMOS, 1893, page 605) says, "This case, where true caries had destroyed an unerupted wisdom-tooth, proves that bacteria are not even an essential factor for caries, as, in this instance, caries did occur on a tooth which never was exposed to external influences, hence also not to bacteria." This statement was ventured by Block notwithstanding the fact that neither he nor any one else had examined the tooth with the object of ascertaining whether bacteria were really absent or not.

Professor Peirce had the kindness to send me the tooth in question some three years ago, but owing to various circumstances it is only now that I am able to report the result of its examination.

The outward appearance of the cavity differed in no wise from any ordinary case of decay, and need not therefore be described.

As the dentin was, of course, completely dried up, I laid the tooth in pure water for twenty-four hours in order to soften the carious portions, and then with a spoon-shaped excavator removed as large a piece as possible, from which I prepared sections by means of the freezing microtome and stained them by the Gram method. The microscopical examination revealed the typical appearances invariably seen in dental caries. The bacteria present were mostly cocci; bacilli were much less numerous. The characteristic iodin reaction could also be obtained, though it was not pronounced. Consequently, as was to be foreseen, the presence and action of bacteria were proven in this case as in all others. The question now arises: how did bacteria get there, and how could they, without fermentable substances, form the acids necessary for decalcification?

The thought naturally presents itself, that, even though the tooth at the time of the extraction was so covered by the gums as to be quite shut off from the oral cavity (Peirce does not seem to have made a thorough examination with reference to this point), it must at a former time have been accessible to the fluids of the mouth. This supposition was supported by the fact that the microscopical examination of the Nasmyth's membrane, isolated by means of hydrochloric acid, not only revealed the presence of discolorations in several places, but also showed the membrane to be invaded by bacteria of various forms. Furthermore the fissures were distinctly discolored.

These facts could be explained, if the tooth had really never been erupted, only on the supposition that a process of suppuration had existed in the neighborhood of the tooth, but Peirce does not mention anything of the kind in his report. All the facts point to the conclusion that the tooth in question must at some time or other have been, for a considerable period, exposed to the action of the secretions and food particles in the mouth. At all events it was far from being a case of "caries without bacteria."

Through the kindness of Zahnartz Hörstel, of Plauen, I was put in possession of a preparation which might be described in this connection. The two temporary molars and the cuspid (right side below) of a seven-year-old child were extracted on account of a severe suppurative process at the roots. On removing the first molar the crown of the first bicuspid, which was wedged in between the roots of the molar, came out with it. Apart from the defective calcification of the enamel the surface of the crown was covered with black-green spots that had certain likeness to chronic caries. Closer examination, however, showed that it was only a case of discoloration, probably caused by some derivative of the coloring matter of the blood. Numerous bacteria, cocci as well as bacilli, could be demonstrated on the surface of the enamel as well as on the wall of the pulp-cavity, which would naturally be the case in a tooth long immersed in pus. Neither the enamel nor the dentin showed any changes indicative of caries.

# THE IMPORTANCE OF ESTABLISHING A TECHNIC AS WELL AS LITERARY STANDARD FOR COLLEGE ENTRANCE

BY S. H. GUILFORD, D.D.S., PH.D., PHILADELPHIA, PA.

(Read before the National Association of Dental Faculties, August 29, 1898.)

THE good results accomplished by this association in its sixteen years of existence are not only universally conceded, but will ever remain as proof of the wisdom of its organization and its general endeavors to elevate the standard of practice. It was realized that this could only be done by sending into the profession men better equipped for practice than the majority of those then entering it. This required certain changes in the prevailing methods of college instruction, some of which have gradually been brought about while others are in course of development. The association first addressed itself to lengthening the course of study. The recognition of five years' practice as an equivalent of one year's course in college was done away with and an invariable two years' course demanded.

Then came the lengthening of the winter term from four to five and subsequently to six months, after which another year was added to the college curriculum.

With all these advancements, however, beneficial as they were in their results, it was found that a proportion of the yearly graduates were not up to the standard demanded either by the public or the profession, and another change became necessary to remedy the condition. At the time of the organization of this association, and for many years afterward, there were very few dental colleges that inquired into the earlier educational training of those who applied for admission. It seemed to have been taken for granted that any one applying for admission must have had sufficient mental training to enable him to grasp and pursue the various studies of the curriculum. This proved to be erroneous, for it was found that while a student might, by close application, manage to pass his examination in the theoretical branches, he did not have that general grasp of these subjects which was necessary to make him a well-rounded man.

Following this discovery came the adoption of entrance requirements, which necessitated a certain amount of mental training in the schools before the candidate could be allowed to begin his collegiate studies. These requirements were very moderate at first, but were gradually increased until they equaled the completion of a full grammar course.

Thus far the plan had worked admirably, principally because it was gradual. Two years ago, however, a further advance was decided upon by which in the course of a few years the entrance requirements were to equal completion of a high school course. This change was so radical in character that it worked a hardship upon many students who were not able to meet it, and who in consequence were debarred from college entrance.

As a result of this, one year ago the latest advance was annulled and the requirements reduced to their previous standard. This retreat from an advanced position was regretted by many schools, and the question of some advancement from our present standard will doubtless come before the association at its present meeting.

In anticipation of this your essayist decided to prepare this paper for the purpose of presenting certain views upon the subject and offering them for your consideration.

As previously mentioned, the raising of the entrance requirements to equal a completed grammar school course has proven itself a wise act, and none have cause to regret it. With less preparatory training it was found that the student's mental faculties had not been properly awakened nor correct habits of study formed, and that he was in consequence placed at a disadvantage in trying to acquire a knowledge of at least some of the more abstruse subjects which he was expected to master.

In view of the fact that the advancement to the present standard has worked well, the question naturally arises as to whether a further advancement would not be advisable, and, if so, what form it should take. Strange to say, we have thus far been viewing and treating the subject of preliminary requirements from a single standpoint. All of our discussions as well as our enactments have dealt solely with the mental acquirements and possibilities of the proposed student, entirely overlooking or ignoring the equal or more important feature of manual dexterity or mechanical bent.

All of us are fully aware of the absolute importance of mechanical talent in the practice of our profession, and we are equally cognizant of the fact that unless this talent is innate it will always be lacking, for it cannot be acquired. No amount of training and instruction can develop a skillful mechanic out of one who lacks the mechanical instinct. If this be so is it not important that we, as teachers, see that those who place themselves under our care for preparation for their life-work are possessed of this necessary qualification? In former times, before the wave of progress had swept across the beaten path of dental education, when the student received his preliminary, and at times the greater part of his dental training in a preceptor's office, or rather laboratory, it was an almost universal custom for the practitioner, before accepting a student, to ascertain whether he possessed a natural bent in the line of mechanics.

This was done by inquiring into the young man's turn of mind, his fondness for tools and their employment in constructing some of the simple mechanisms so necessary to the complete happiness of boyhood. In addition to this it was customary to accept the student for a certain period upon probation, to still further ascertain his adaptability to his proposed life-work.

While in these later times we recognize the shortcoming of our predecessors in not demanding at least some educational requirements from their students, may we not at the same time take a hint from their methods, and incorporate some of their requirements into our own? In other words, has the time not fully arrived when we should demand mechanical talent as well as scholastic acquirements as preliminaries to entrance upon the study of dentistry?

It would seem that in this matter as in many others we have been rather blindly following in the footsteps of our sister profession, medicine, not fully appreciating the differences that exist between them. Dentistry occupies rather a unique position among the sciences and professions, in that to be of the greatest service to mankind the practitioner must necessarily be possessed of considerable manual dexterity.

This is not required of the lawyer, the theologian, or the physician in ordinary practice, for their success depends mainly if not entirely upon the development and use of their mental faculties. For one undertaking the study of any of these professions it is therefore quite proper that the only qualification demanded should be a scholastic one.

Should the student of medicine prove to be possessed of mechanical talent, he will, after graduation, naturally drift into the special practice of surgery, which will be more to his taste, and afford him a better field for the employment of manipulative skill. Should his taste not run in the mechanical line, he still has in the domain of general practice and some of the specialties a large field for successful effort.

With us it is different. To properly serve the needs of his patients the dentist must be skillful with tools, for so large a part of his daily work is manipulative in character. If he lacks this skill he must prove a failure, for in the practice of dentistry there is no place for the employment of the mental faculties alone as there is in medicine.

The vocation of the instrumental musician bears some little resemblance to our own in that it requires for its successful pursuit not only the development of the mental and esthetic qualities, but an absolute dependence upon manipulative ability. Without the latter the former quality would be of no avail. A teacher of instrumental music would probably prefer to have as his student one with a liberal education, for he would add luster to his chosen calling; but he would certainly not accept or retain as a pupil, no matter what his literary attainments may be, one who was lacking in technical ability or possibility.

Why, therefore, should we do less?

The dentistry of to-day owes much of its progress and high standing to the class of men who entered it from thirty to sixty years ago under the private studentship system. Almost without an exception they were men possessed of a high order of mechanical and inventive ability, and they were so because they were selected from the mass by their preceptors.

It therefore seems to me that it would only be the part of wisdom for us to so amend our requirements as to include manipulative ability, and where this is lacking to reject the student and advise him to take up some other calling. It certainly does not seem just to accept a student who is by nature lacking in that quality which is absolutely essential to his success in practice.

With our greatly improved methods of systematic technic instruction we have certainly accomplished good results with the material given us, but how much better might have been the results with the material properly culled. Many students, as we all know, manage to work along through college, performing their allotted tasks and passing the required examinations, who we are morally certain will not be successful in practice because all that they accomplished was performed in a labored way, without any display of actual skill.

Are we just to them and to the public in permitting this? Should we not discover the lacking quality before accepting them, or find some way of discovering it in the early part of their course and kindly advise them to change their vocation?

If by some extra effort on our part we were able to develop skill where natural ability is lacking, the conditions would be different, and we would be relieved from the necessity of considering the question; but unfortunately we cannot grow the plant where seed or soil is lacking.

The question now arises, What shall the mechanical standard be, and how may it best be incorporated with the other requirements? This is not for me to answer. It is a problem, and its solution will require the united wisdom of the members of this association.

By way of suggestion, however, I would offer the following:

1. The student should be assigned a desk or bench in the laboratory, furnished with the necessary tools and material, and be given an appliance or device which he is to reproduce as accurately as possible.

2. The task assigned should be such as to preclude the probability of his having done work of exactly similar character before, so as to guard against mere automatic repetition.

3. The ordinary laboratory processes, involving no special skill, such as repairs or additions to vulcanite plates, should be excluded.

4. In cases where the candidate has had no experience in the use of some of our special tools or processes, such as soldering, swaging, etc., the test should be simple in character, and might consist in requiring him to reproduce from a block of wood, by means of saw, file, and penknife, some geometrical form, as a cube, pyramid, or rhomb.

5. In cases where the applicant has had some laboratory instruction or practice before coming to college, the test should be a little more severe in character. Inasmuch as regulating appliances are so varied in character, and often combine a number of different manipulations in their construction, such as filing, bending, soldering, etc., the construction of one of unusual design would probably furnish the best all-around test of ability.

6. During the test the student should be isolated until the task is completed. A competent demonstrator should watch the progress of the work from time to time, so as to form an opinion of the candidate's handiness with tools, but should offer no aid, even in the way of suggestion.

# ABSTRACT OF THE REPORT OF THE COMMITTEE ON FOREIGN RELATIONS OF THE NATIONAL ASSOCIATION OF DENTAL FACULTIES.

(Made at Omaha, Nebraska, August 29, 1898.)

TO THE PRESIDENT AND MEMBERS OF THE NATIONAL ASSOCIATION OF DENTAL FACULTIES:

The special Committee on Recognition of Degrees in Foreign Countries, and the Comparative Value of Foreign Degrees in this Country, appointed at the last meeting of this association, begs leave respectfully to report as follows:

The scope of the investigation of the committee has been somewhat changed from that which would appear to be indicated by the announcement in the published proceedings. It should not be forgotten that there are really no foreign degrees in dentistry, the nearest approach to this being the licentiate in England. America is peculiar in having a distinct and separate diploma for the graduates of distinctly dental colleges. We cannot hope for the recognition of this distinction until our course of instruction is fully comprehended in Europe, and the reputability of our degree established. The report of your committee, then, will specially consider the preliminary steps which we believe it proper to take before commencing further agitation. The subject is of the deepest significance, and involves our whole system of education. There can be no mutual recognition until there has been secured some common ground on which the profession of the various countries of Europe and of America can meet. At present the systems are too diverse, and involve too many seeming contradictions to allow any real reciprocity. Yet that is a consummation devoutly to be wished, and certainly we in America should spare no pains in the endeavor to bring it about. Hence the appointment of a committee to take the subject into consideration by the supreme authority in matters educational among us was doubtless a wise movement, and one which, in the opinion of your committee, should be persistently followed up. Indeed, the committee has received many letters highly approving of the action taken, with the promise of a hearty co-operation on the part of American dentists resident abroad.

That this body may act intelligently, it seems necessary in this report to review, as concisely as is possible with thoroughness, the real situation, with the view of securing a better state of affairs.

It must be remembered that scholastic dental practice, with the separate teaching which has been found necessary, is of quite recent origin. The first distinctive dental school was established in America in 1840, less than sixty years ago. For more than forty years all didactic and class instruction was confined to this country. Within the past twenty years dental schools have been organized in some of the countries of Europe, usually in connection with hospitals, for the purpose of securing clinical instruction and material. There has never been any reciprocity between the schools of the two continents, if we except the recognition temporarily granted by England to the dental departments of Harvard and

Michigan Universities. The conditions obtaining in the two continents too widely vary. The one is long settled, possessing the real erudition that can only be found in nations that have a past, but imperatively dominated by the traditions and precedents which are the natural outgrowth of heredity. The other has been a new country, with no educational or other institutions hallowed by centuries of growth and progress and possessing the weight of ancestral influence. In the settlement and development of this country our people encountered obstacles wholly unknown to the older states of Europe. Precedent there was none to guide, and tradition there was none to influence. The problems which confronted them were conditions existing, and not theories for consideration. The forces of nature were in one sense our foes, and not our allies. It was necessary first to overturn and reconstruct that which nature had already constructed. The struggle to accomplish this made of us a practical, inventive, ingenious people, who care mainly for ends and little for methods, while Europe respects no practical accomplishment that is secured through irregular, unacknowledged methods.

All these matters are reflected in the status of the dental profession here and abroad. Europe cannot be brought to believe in a practice not founded in a liberal preliminary education, while we are, as a whole, too careless concerning methods, so long as anything practical is assured. In Europe, if a man has a university education he is popularly supposed to be competent to practice any profession,—law, medicine, divinity, or any of the specialties,—any distinct instruction being required only to make him acquainted with the tools that he must use. The university degree is supposed to include everything lesser, and hence there is no necessity for any other, that comprising all.

We in America have instinctively recognized the desirability of a university training by founding many schools without sufficient endowment for their independent support, thus really cheapening the university course. This has been through the endeavor to extend educational facilities to the masses, here again looking toward ends and not means.

The natural consequence to our profession has been that in America to-day are probably found the best skilled operators and the highest development of practical work, while in erudition we are in the rear of England, Germany, and France.

It may thus be seen that it is difficult to find a common ground on which the professions of the old and the new worlds can stand in equality. Europe will tolerate nothing that does not bear the stamp of regularity. We are satisfied with anything that accomplishes the end sought.

The curricula of the schools of the two continents materially differ. But that could be overlooked, or they might be harmonized. The essential variation lies in the methods, or the way through which admission within the ranks of the profession is secured. The old countries jealously guard the doors of entrance. We throw them wide, or, at the best, erect a barrier that is too easily overleaped. Europe declares that the learned professions must be reserved for the learned classes, and that any who enter must come through the door of a liberal education. We urge that the only sufficient qualification is fitness and practical knowledge. Europe will never come to our standpoint. Can we, or should we attempt to reach hers? In the process of time this may undoubtedly be brought about. Already in America we see the effect of a comparatively low standard of requirements in the overcrowding of the professional ranks, so that they are losing their distinctive respectability and status, and with that their influence for good is circumscribed. Should this acceptation of the professional tone continue for any length of time, there will be no distinction between the professions and trade. Indeed, we find to-day many who contend that no line of demarkation should be drawn. Colleges of law, medicine, and divinity, with their specialties of dentistry, pharmacy, etc., are so multiplying that the consequence must eventually be self-destruction and the annihilation of all professional sentiment.

A limit must be placed on the number of schools, and this can only be done by raising the professional standard to a point that will shut out unworthy and unqualified colleges and their students. When this is done, and our preliminary educational standard is sufficiently advanced, with our practical methods and operative skill we shall be prepared to force the profession of Europe to come to our standard if we are in advance of them, while if they are ahead of us we will be equally bound to reach their level. Even as it is, we are fast approaching each other, they growing more practical and we more erudite. To hasten this desirable end, in the opinion of your committee this association should endeavor to secure the co-operation of our *confrères* of the different countries by some official reciprocity, and we believe that the best method to accomplish this would be through the appointment of a standing committee on foreign relations, whose duty it shall be to make us better acquainted with European educational methods and curricula, and to inform them of the advantages of ours. This might smooth many of the asperities and remove many of the prejudices which work to the detriment of both at the present time.

The second matter referred to this committee involves our relations with our American *confrères* living and practicing abroad. This is closely allied to the subject already considered. American dentists practicing in Europe have bitterly complained of the granting of the peculiar American degree to those who are, in foreign countries, considered unqualified. There is no questioning the fact that this has been done in the past. The time once was when foreigners flocked to our shores to complete their dental education by an American course of study, and by the securing of an American degree. This was materially checked by irresponsible institutions which conferred their honors too indiscriminately. The American degree was fast falling into such disrepute that it became necessary to do something, and accordingly this national organization of teachers was formed. I need not enlarge upon its great accomplishments. But unfortunately it was not conceived soon enough. Cause for reproach had already been given, and Europe has not hesitated to take advantage of it to her own benefit and in her own interests, and hence the D.D.S. does not now receive the consideration to which of right it is entitled, nor has sufficient credit been accorded to the work of this National Association. It takes a long time to live down the bad reputation that may be gained in a day.

Two things are charged by American dentists practicing in Europe:

*First.* That students from the old countries are received by our schools and given advanced standing on the presentation of certificates in foreign tongues which are really worthy no consideration whatever.

*Second.* That diplomas are practically sold by American institutions, and degrees conferred *in absentia.*

There is, unfortunately, no disputing the fact that our *confrères* abroad have sometimes had cause for complaint that the value of their diplomas has been depreciated, and that they have not been sufficiently protected by the schools granting them. Even since the organization of this association of colleges, its rules governing the admission of students have been violated on different occasions, through ignorance of the value of some of the certificates which the regulations have made necessary for advanced standing.

It is also more than probable that worthless and even fraudulent certificates have sometimes been used as pretexts for giving advanced standing in certain American colleges, when their real character should have been well known by the authorities. A foreigner who desires an American degree, and who occupies but a low social position at home, procures a certificate from some unqualified source, perhaps under false representations. It is written in a foreign tongue and sealed with some pretentious seal, possibly that of an emigration or other bureau. This he presents to the American college, assuring the authorities that it represents a definite course of dental study. The dean is perhaps unable or indisposed to have it verified, and it is accepted; the applicant under it is admitted to the senior course and graduated at the end of a single term. Thus, after an absence of but a few months, the student, perhaps a servant or a barber's apprentice who had become possessed of a little money, returns to his native land and flourishes in the faces of his former associates a diploma that should be the distinguishing characteristic of an educated man, and claims to be the *confrère* of those who have honestly earned a certificate of fitness from an American school, and upon whose diploma this unmerited scandal and disgrace has thus been brought.

It is possible that the institution thus offending may have been nothing more than careless. It would take weeks to verify the certificate presented, and then it would be too late for entrance. There are no means at hand by which the value of the document can be ascertained, and so the applicant is given the benefit of the doubt and admitted to advanced standing.

Formal complaint was last year made by American dentists in Switzerland in the case of a man named Stauber, who was admitted to the senior class of a college having membership in this body. He had been permitted to join upon the presentation of a foreign certificate. Culpable negligence seemed to have been exercised, and had it not been for the energetic protest of our *confrères* abroad the student would have been graduated at the end of a few months. Upon the presentation of the case the college reduced Stauber to the freshman class, and he must wait for his diploma. It is further charged that he was matriculated when not in this country, the date of the closing of the time for registration having expired before his arrival in America. Such cases as this should be closely investigated, that the offending college may be punished if guilty, or exonerated if innocent.

It has appeared impossible in many instances to determine the character of the certificates presented. The foreign school, or pretended school, is unknown here. We have no list of such, and great injustice might be done to applicants if the document is refused, provided it be genuine and sufficient. But it is quite proper for every college to insist upon the indorsement of some known authority. If, as it now is, the authorities are conscientious in the matter and ask for a verification of the document presented, the prospective student perhaps brings a countryman who is suborned to give a false interpretation of it. Or he goes to a rival school, representing that the first to which he applied, and which calls for the additional testimony, had accepted him, but that he had found the college to be inferior to its neighbor, and so he wishes to transfer his matriculation to a better one. That appeals to more than one perverted sense, and he is accepted on his mere assertion, skillfully made, that the document had been approved by the other institution, and is given advanced standing.

As for the determination of preliminary qualifications, that is a yet more difficult affair. The systems of general education in different countries are so diverse that it is almost an impossibility to decide what may be accepted as the equivalent for the standard of the National Association of Dental Faculties. And so the reception of students from abroad is a matter in which the most conscientious dean may be at fault.

This condition of affairs has long existed. It forms the basis for many bitter complaints on the part of both foreign and American dentists practicing abroad. It very loudly calls for reform, and to your committee it seems that the good name and reputation of this association is concerned, and that we are in honor bound to seek some remedy.

The communications from abroad that have been referred to this committee suggest that a board of European dentists should be appointed by this body, who shall take cognizance of such cases, and whose indorsement of the status of a proposed student shall be necessary for his matriculation in any recognized college. To give to such a foreign and irresponsible board plenary powers in the acceptance of applicants for matriculation from abroad is, of course, quite impossible. We have no legal or moral right to delegate the authority that has been by law vested in the responsible faculties of our colleges. In some of the states the determination of the qualifications is vested in state authorities, and they could not and would not delegate it to any board whatever. In the state of New York the college officers have nothing whatever to do with the determination of the preliminary qualifications of applicants, who must obtain from the state regents a dental student's certificate before they can be accepted.

But your committee can see no objection to the naming of an advisory board, whose indorsement of any paper and whose certificate of educational and moral status may be considered sufficient, and it therefore recommends that not more than three qualified persons, resident in each of the principal countries of Europe, be appointed as an advisory board, to whom students from abroad may present certificates of qualification and moral character for indorsement, or to whom the papers of students from abroad, concerning which there is doubt or uncertainty, may be referred for authentication and approval. Your committee was advised that this matter would be brought before the American Dental Society of Europe, at its meeting in London August 1, and that the chairman would be apprised of any action there taken.*

The second cause of complaint that has been urged before your committee is that degrees from institutions with high-sounding titles and names, and which are perhaps indorsed by state officers as having legal status, practically sell their diplomas abroad. This complaint is also one of long standing, and your committee believes that it is well founded. The condition is one for which, however, this association is not responsible; yet it seriously reflects upon American educational institutions, and is a source of scandal and opprobrium which cannot be ignored by it. In foreign countries the embarrassments of the situation are not comprehended. Under all the European governments it is possible to enact a general law that shall be effectual. We have nearly fifty separate states, each autonomous so far as its domestic affairs are concerned, and all educational matters belong in that category. Hence one state may enact a law under which it is possible to incorporate an institution essentially fraudulent in its character, and the other states are powerless to prevent or correct the evil.

The state of Illinois is a glaring example of this kind of vicious legislation, and nearly or quite all the fraudulent colleges are now located in the city of Chicago, to the great reproach of the state and the profession of dentistry within its borders. That city contains some of the very best of our professional educational institutions, and at the same time the most villainous impostures conceivable. Dentistry in Chicago can boast of as high-toned and eminent practitioners as are found anywhere in the world, and it is disgraced by some who appear to acknowledge none of the usually accepted professional obligations, while using the professional name to further their own illegitimate ends. Unfortunately it is sometimes hard for the uninitiated to tell them apart, for some of the latter have held responsible professional positions, and use that seeming indorsement in the pursuit of their illicit business.

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*Since this report was presented and adopted the chairman of the committee has received an abstract of the proceedings, in which was recommended the very action taken by the National Association of Dental Faculties at its late annual meeting.

Men unacquainted with professional educational affairs, who know not the wiles of designing tricksters who would take advantage of an innocent law to further their own selfish purposes, are not the best judges of what is proper legislation for the professions. In an unsuspecting moment, and without sufficient consideration, there was placed upon the Illinois statute-books an enactment which, while assuming to further business interests and honestly intended for their benefit, allows the incorporation under the law of associations that are carrying on a fraudulent diploma business. So loosely or nefariously drawn was this bill that for the merely nominal fee of registration, amounting to less than five dollars, totally unqualified men are permitted to issue diplomas of qualification in the different professions. This seems a monstrous state of affairs, but it has been suffered to exist for years. The citizens of other states are powerless, for Illinois remains an outlaw in this respect, and continues to protect her criminals in their villainy. The task of securing the repeal of this vicious law is too great for the courage of its reputable men, for ignorance and vice have struck hands in its maintenance. Even the excellent and influential Illinois State Dental Society has looked upon this condition with seeming indifference. As a consequence of the continuance of this demoralizing law a considerable number of the practitioners of Chicago carry in their pockets, or exhibit on their walls, college charters conferring upon them the power to issue diplomas in dentistry. It seems to your committee that the decent part of the profession of this grand state should begin an agitation for its repeal. It is earnestly to be hoped that as soon as the professional men of the state are aroused from their lethargy and made to comprehend the enormity of the condition, they will present the matter before the Legislature in its proper light, and the disgraceful law will be so amended that it will not apply to educational institutions, and the charters already issued under it will be very promptly canceled.

Some of these so-called dental colleges have no other existence than this state incorporation. They are owned and run by one man, and he perhaps sails under a false name. Of course, if they give no instruction whatever, and yet confer degrees, they are amenable to the general law against fraud. But their diplomas are not offered at all in this country, being only advertised abroad. They know very well that if they attempt to ply their infamous trade at home they will speedily be brought to grief, and so they permit no proofs of their nefarious work to come to light in America. There is no indication of their business at their published address, and any letters sent to them from this country are carefully left unanswered. Their work is done through European agents. We cannot locate them, and there are no proofs to be obtained in this country. Our *confrères* abroad complain bitterly of these swindlers, but they do not comprehend the situation; and when we ask them to obtain the proofs of their villainy they reply that the miserable affairs are under our immediate noses, and we should get the testimony here.

Sometimes our professional journals, and some of our prominent men, and even professional organizations instituted for the purpose of regulating dental practice here, unwittingly further the objects of these men by falsely charging that respectable schools are practically engaged in the same business of granting irregular degrees, and thus they efface the line of distinction that the reputable colleges have been striving to set up. It is a singular fact that nearly or quite every application which approved colleges receive for irregular degrees comes from Europe, and because of these miserable vilifications of respectable schools by American dentists acting with more zeal than discretion and more fervor than knowledge, there is not an American college that is free from these insulting applications.

This is the condition that confronts us in America. This association has done what it could, and advanced as fast as it could. It has been embarrassed by the lack of co-operation, and even by the active opposition of those to whom it had a right to look for help. It has been denounced because it has not taken the radical steps demanded by men who have little comprehension of the difficulties to be met, and who do not comprehend that the tone of the colleges and the profession as a whole can only be advanced by a movement that is made as a whole. At the most critical moment, the ground that had been gained has been lost through the absolute refusal of some of the colleges to vote to sustain the most moderate requirements, and it may almost be a matter for astonishment that so much has been accomplished. This association has sharply drawn the line between the reputable and the disreputable schools, and despite the fact that over-zealous and unwise men have been industriously engaged in effacing it, and confusing the good with the bad by claiming that all have the same character, in this country the distinction is well known. It should be, and if these ill-advised strictures are abandoned it will soon be, as well comprehended abroad. All that is necessary is to scan the list of the members of the National Association of Dental Faculties, and if the name of an institution granting a diploma is not found in it that document is worthless and unacknowledged here. If any college that has a membership in this association grants a degree or accepts a student irregularly, the faith and honor of every other member is pledged to inflict the most condign punishment upon presentation of the proofs.

But it has been charged that violations of the rules have been committed by members without subsequent punishment. There appears to be an impression that it is the duty of the association to discipline a college upon mere rumors, and to inflict punishment without proofs. This would be the rankest injustice. There have never yet been definite charges made against a college by any responsible party, with accompanying proofs or positive information where evidence could be found, without the most thorough investigation. It has been charged before your committee that the Stauber case was such an one. But in that case the implicated college corrected the error of its own volition. The remedy for infraction of our regulations thus rests in the hands of every respectable member of our profession, for so carefully has this association guarded this point that it has appointed a committee with plenary powers for the express purpose of investigating charges of irregularity brought between the sessions, thus offering swift as well as exact justice.

As to the fraudulent colleges, your committee considers it the imperative duty of this body to employ every possible means for their exposure and suppression. We believe that it should protect the good name of American dentistry and American educational institutions. In this faith your committee, through its chairman, authorized the expenditure of a reasonable amount of money in the prosecution of investigations of unrecognized and fraudulent schools, and secured the co-operation of a thoroughly competent man for this work. As a consequence, considerable progress has been made in the unearthing of some of them. But it will probably take years of persistent effort to accomplish all that is desirable. We have received the most encouraging letters from our *confrères* in Europe, and have been materially aided by some of them. We have been assured that if such work is continued it must result in the higher appreciation of this association in Europe, and in the perceptible raising of the estimation in which our degree is there held. Hence we feel warranted in urging upon you increased zeal in the prosecution of the work already commenced.

In view of all the considerations that have been presented in this report, your committee recommends the adoption of the following resolutions:

1. *Resolved*, That a standing committee of five be appointed each year by the president of this association, to be called the Committee on Foreign Relations, whose duty it shall be to report each year upon the relative status of dentistry in America and Europe, and to suggest any measures that in the opinion of its members will promote the welfare of our common profession, and the usefulness of the distinctive American dental degree.

2. *Resolved*, That the Committee on Foreign Relations be instructed to use its utmost diligence in ferreting out fraudulent or irregular colleges, and the granting of degrees irregularly by recognized colleges, should this be done, and to leave undone nothing within their power to bring to justice institutions granting irregular degrees or degrees irregularly. To this end this association authorizes the committee to expend any reasonable sum of money, which, if necessary, shall be raised by some fair assessment of the colleges of this association.

3. *Resolved*, That an advisory board, to consist of not more than three qualified persons from each of the following named countries of Europe, be appointed by this association, to the member or members of which the papers of any foreign applicant for matriculation in any American dental college shall be referred for verification or indorsement, it being understood that such papers shall be referred to the member or members of the board appointed for the country in which the applicant is or has last been a resident. The countries to be represented shall be: 1, Great Britain;

2, Holland and Belgium; 3, Denmark, Norway and Sweden; 4, Russia; 5, Germany; 6, Austria and Hungary; 7, Italy and Greece; 8, France; 9, Spain and Portugal; 10, Switzerland and Turkey.

W. C. Barrett,
S. H. Guilford,
D. J. McMillen,
F. D. Weisse,
A. H. Fuller,
*Committee.*

# CORRESPONDENCE.

## MR. CHARLES TOMES *IN RE* GRAY'S "ANATOMY."

To the Editor of the Dental Cosmos:

*Sir,*—In the latest (fifth) edition of his work on Dental Anatomy Mr. Charles Tomes refers to what he terms the fantastic theories of Dr. Bonwill, meaning thereby the series of diagrams and measurements through which Bonwill has essayed to find a geometrical design underlying forms, sizes, and arrangement of the human teeth, and states, "I would not refer to them [the theories of Bonwill] at all were it not that they had in some unaccountable way found entrance into the last American edition of Gray's 'Anatomy.' "

If Mr. Tomes will consult the pages of Gray's "Anatomy" of which he speaks, he will find that the idea of geometrical design as set forth by Bonwill is not mentioned.

The statement of Bonwill, a statement indorsed by every one who has made the same measurements, is, however, given,—viz, that "lines drawn from the line of junction of the lower central incisors to the center of each articular face of the inferior maxilla form the sides of an equilateral triangle whose base is a line joining the centers of the condyles, and that the usual length of a side is four inches." This is the sole mention of Bonwill's triangles.

The reason for the introduction of this statement of fact is the general reason why this, as all other sections of Gray's "Anatomy," has been rewritten and modified.

For several years the leading dental journals, particularly the Dental Cosmos, have complained that the text of the dental portions of this work, and also the dental illustrations, were in large part erroneous, misleading, and not abreast of contemporary knowledge of dental anatomy. In response to these complaints the American publishers arranged to have the text of the dental portion rewritten to accord with present knowledge of the subject, and to alter the illustrations so that the teeth and their associate parts should be as accurately drawn as the illustrations of the eye, for example.

Reviews of these alterations have been made by several journals in the past year.

That Bonwill's data as to the mechanism of mastication are given in "Arrangement of the Teeth" is not at all "unaccountable" if the critic admits that the office of a text-book is to detail facts and principles, and the abstracts from Bonwill's expositions are presumably accepted by the dental world as demonstrated facts.

H. H. BURCHARD.

# PROCEEDINGS OF SOCIETIES.

## DENTAL SOCIETY OF THE STATE OF NEW YORK.

(Continued from page 769.)

FOLLOWING is the discussion on the paper of Dr. I. Norman Broomell, "The Histology of Cementum," printed in full at page 697, DENTAL COSMOS for September:

Dr. THOMAS FILLEBROWN. I do not profess to be an expert in the histology of the teeth. I do take a great interest in the subject, however, and I listened to Dr. Broomell's paper last year at Old Point Comfort and to the paper to-night with a great deal of pleasure, and from them I have learned a great deal.

The paper and the pictures develop new points. The paper leads me to wonder why these things happen. Why does one set of cells produce the lacunæ, another set produce the dentin, and another the granular layers? I suppose we must go back to the first cause and rest upon the fact that the cells have an intelligence, for it really amounts to that. They have in themselves an instinct to form a normal cementum or other tissue, and if not disturbed each tissue will be all alike; but these varieties which the doctor has so clearly described I suppose are caused by disturbing influences.

I was particularly pleased with the character of the illustrations which showed the laminated structure of the dentin, and I wish to emphasize my appreciation of the accuracy and great excellence of the illustrations shown to-night and of the practical value of the paper read. It will, I am sure, form a valuable addition to our literature on the subject.

Dr. BARRETT. I cannot quite understand the nomenclature used by the first essayist in speaking of the lamellæ of cementum. According to the terminology with which I am familiar, there are no lamellæ; that is, no concentric arrangement of the cells. When we come to consider what the cementum is, we find it simply a modification of bone-tissue, made up of precisely the same elements. The lacunæ are essentially the same in cementum as in bone. Precisely the same elements enter into the structure, but a little more of the inorganic and less of the organic. We have as the distinguishing characteristic of bone the concentric arrangement about the Haversian canals. In the differentiation of cementum from bone we have lost this peculiar arrangement, and have left simply the lacunæ and the canaliculi. The next modification from bone, through cementum, will be dentin, in which are lost the lacunæ, and there is remaining nothing of the structure of bone except the canaliculi, or their analogues, the dentinal tubuli, and that is the main difference in the differentiation, in the change, in the growth from bone to cementum. You know that bone cannot for an instant be exposed, even to air, without the most disastrous consequences. Cementum will not long withstand exposure. Dentin is more resistant, while enamel is so greatly differentiated that its normal condition is one of contact with external objects. We reach the highest development and differentiation in the enamel, the modified structure of which enables it to withstand attrition, and the application of acids, alkalies, and all the different foreign substances that enter into the mouth. In that we have lost the lamellar arrangement, and the canaliculi and lacunæ, and we have nothing left of the organic portion of the tooth except the mere septa between the enamel-prisms, which are slight, but which give it a certain amount of life. The study of the formation of cementum is very interesting. We know that in the genesis of tooth-tissue we have the formation of the enamel first, then the dentin, and lastly the cementum. When the tooth is ready to erupt we have the formation complete of the enamel, with a portion of the dentin, but not until a later period comes the development of the cementum to form the root, and to lift the crown up through its investments.

Just at that point is where the illumination comes into my own mind, in which I can trace to a certain extent the development of the cementum from the pericementum. Dr. Fillebrown could not mean that there was any doubt about the nourishment of the pulp, and therein comes a beautiful illustration of the possibility of the retention of a tooth with a devitalized pulp, in which is destroyed the vitality of the dentin, but not that of the cementum. What was so exceedingly interesting to me was the point of the divergence, and the diffusion of the calcium salts through the cells. I wish there was time to enlarge upon this,—to debate and consider it,—so that we might arrive at a clear, perfect comprehension of the measure and manner of the development of these lacunal corpuscles and the cementum cells.

I wish the doctor had pointed out more clearly in the slides the differentiation between the pericementum and the cementum itself. I will not follow out the line of thought, which seems to be such a broad field that none of us can have any possible conception of it with our present illumination.

Dr. L. C. LeRoy. Making deductions from Dr. Barrett's remarks, why are not the pulp-tissue, the lacunæ, and the canaliculi the representative of the Haversian system? I simply put the question to Dr. Barrett on the hypothesis of his remarks.

Dr. Barrett. The pulp is largely made up of connective tissue, and hence there is little analogy. For more than twenty years I have taught that the nutrition of the pulp is always from the pericementum, and that that is the placental organ which supplies it with its pabulum. I believe that in growing teeth there are Haversian canals, and I have positively demonstrated them in cementum, penetrating the dentin and forming connection with the pulp.

Dr. Marshall. The point that Dr. Barrett has just mentioned is one that is still in dispute, and one which I think Dr. Cryer could settle on the screen in just about one minute.

Dr. Broomell. I have but few remarks to make in closing. The questions which I had noted have already been partially answered. Dr. Barrett answered Dr. Fillebrown's question as to the origin of the pulp. As you all know, it originates from the inner wall of the tooth-sac.

Dr. Sidney S. Stowell, of Pittsfield, Mass., read the following paper:

## Dental Bridge-Work, Fixed and Removable.

Dental bridge-work is at the present time the most used and most abused branch of dentistry.

As often seen in the mouths of patients, it is the nastiest thing conceivable; it is also the neatest dental device, according to merits of the work.

At its *best* no progressive, up-to-date dentist should or can afford to be without it. At its *worst* all should avoid it.

But few can be perfect in its construction; those who cannot perfect it, and who recognize that fact by their record of failures, do wisely to abandon the work, or study the science of dental bridge engineering until it is mastered.

There are many reputable men in the profession who frankly admit that they do not do dental bridge-work, and I honor them for their honesty. And I condemn the men who through ignorance and inability continue in their botchery. The laws under which we live make no excuse for ignorance. When any man broadly condemns dental bridge-work and pronounces it a curse to humanity, he admits his own inability to make a good bridge; but he does not prove that others cannot and do not perfect it.

If I had a bad record of failures, I would try to find out the cause and correct it if possible. I have had failures; yes, many, and by these have I been taught my most valuable lessons.

It is my opinion, based upon experience and observation, that no removable bridge, however constructed, can be as cleanly as a perfectly-constructed fixed bridge; there is no good reason why a fixed bridge should not be as cleanly as the natural teeth in a state of perfect health. The great objection to fixed bridges has been the liability of the porcelain facings to fracture and the supposed difficulty in repairing them; this, however, need not be considered a difficult operation when understood.

Taking advantage of modern invention, no one need fear the breaking of porcelain facings. I am indebted and shall be ever grateful to Dr. George A. Bowers, of Nashua, N. H., for a most perfect system, which I will briefly describe. The tooth is ground to place, backed with 24-carat No. 32 gold, burnishing well over the edges to protect the porcelain from the borax; backing is now removed, and a piece of No. 22 to No. 24 22-carat gold is placed on the tip, extending from the pin-holes to the tip that is soldered to the backing, which is then replaced upon the tooth and finished with file or wheel. By this method the fracture of facings is rendered practically impossible.

I would, unless in exceptional cases, avoid an all-gold crown in the front of the mouth, for esthetic reasons. The practical value of an all-gold cuspid as an abutment to a bridge may in some cases outweigh the esthetic objection to it.

The dental bridge most commonly called for is for the purpose of supplying the lost upper bicuspids. The construction of this bridge presents the greatest objections from the esthetic standpoint, because of the usually sound cuspid which must be used as one of the abutments for the bridge. Conditions must here govern the method of procedure. I have many times cut off a sound cuspid for the purpose of making a Richmond crown, so called, and supplying the two bicuspids or molars, bridging to whatever abutment I could secure in the posterior part of the mouth. I have yet to regret that operation, although I have never become so radical a surgeon as to resort, without some pricking of conscience, to the cutting off of a sound cuspid. I have in use a great many bridges, extending over periods of from six to eight years, where I have put an all-gold crown upon the first molar, carrying in the first and second bicuspids and anchoring the forward end of the bridge by a dovetailed bar into a large gold filling placed in the distal approximal surface of the cuspid, placed there by myself for the express purpose of anchoring a bridge. I make this explicit, because I wish to emphasize that in the placing of that filling I realize every moment in the preparation of that cavity what is expected of that filling. I give it no ordinary anchorage; I give it an extraordinary anchorage. I cut through to the palatal margin, forming a dovetail cavity. I cut as deep a margin as possible consistent with the general construction of the tooth, considering well the principle of force and resistance, and I will say with all honesty that I have not met with a failure in that anchorage. I have modified the method of attaching the bridge to this filling by making in some cases simply a bar and slot, in which the bridge rested for support. In another case I have made the bar of dovetail shape, and cut a dovetail in the filling, allowing the bar to dip into that. In many cases of late I have followed the principle of boring a round hole down into the large portion of the filling. While preparing the cavity I select a drill, and carry in my mind's eye the outlines of the filling as it will be when finished. I place a platinum-iridium or clasp gold wire of about fourteen gauge, passing over it a pure gold disk a little smaller in circumference than the extreme circumference of the filling, so the margin lies a little within the margin of the filling. This is waxed in place on the wire, invested, and soldered. The gold is then burnished over the filling and the wire cut off, the crown placed on the first molar, and the construction of the bridge commenced from that point. In soldering, the little dowel and disk are incorporated in the bridge. I have been very cautious where I have placed it, that a sound, substantial cuspid was used, and the filling anchored upon my honor. I have taken the liberty in some cases to prepare a cavity in a perfectly sound cuspid, and have yet to regret that procedure. This should always be a loose joint; a tight joint would loosen any filling.

The removable bridge of which I promised to speak on this occasion is one in my own mouth, and at the close of the meeting I will submit myself to an examination. I placed it in position and wore it for six weeks without removing it, then submitted to its removal before a body of dentists, and we found that while it was not perfectly clean it was not very dirty, but under the bands it certainly was not in a thoroughly aseptic condition.

The bridge supplies the upper left lateral incisor, and the first and second bicuspids. In reference to the matter of clasps spoken of yesterday, I wore a clasp plate which involved the loss of the enamel upon my cuspid and first molar, and the teeth became very sensitive. I wore a gold plate for several years, and then a rubber plate, and both were exceedingly troublesome to me.

I will briefly detail the construction of this bridge. An all-gold crown was fitted to the cuspid, a narrow band or shoulder made by winding wire of about thirty gauge around at the gum margin; this was soldered to the crown, forming support for a band around the crown to which the bridge was fastened with solder. The molar crown was constructed in the usual manner, and a little square box placed in the anterior surface of it. A square bar was put in the box, and a gold clasp fitted tightly to the crown. The bar and clasp were soldered together, put in place on the crown. The band around the cuspid was put in place, an impression taken in plaster, the crowns were removed, leaving the clasp and band in the impression. A model was cast upon which appeared the clasp and band, which were then incorporated into the bridge in process of its construction.

Dr. JOHN S. MARSHALL, of Chicago, Ill., read a paper of which we give the following abstract:

## LEUCOPLAKIA.

MR. PRESIDENT AND MEMBERS OF THE NEW YORK STATE DENTAL SOCIETY:

Leucoplakia is a term derived from the Greek—λευκός white, and πλάξ surface,—literally white surface or whitening of the surface.

*Definition.*—Leucoplakia is a chronic superficial inflammation of the mucous membrane of the tongue, the cheeks, the palate, and the gums, and is characterized by the presence of pearly-white or bluish-white plaques or patches; in some cases small, in others covering the entire dorsum of the tongue, the cheeks, from the angle of the mouth back to the fauces, the palate, or the entire buccal surface of the gums. Various terms, such as *leucoplakia linguæ*, leucoplakia buccalis, and leucoplakia gingivæ, have been introduced to designate the location of the disease.

*Nomenclature.*—The disease is variously known as psoriasis linguæ, zona (herpes zoster), smoker's patch, leucoma, leucoplakia, ichthyosis, leucokeratosis, leucoplasia, leucoplaques, plaques opalines, and superficial glossitis.

*Varieties.*—There are two forms of leucoplaques found in the human mouth, the milky opaline patches (plaques opalines), represented by the mucous patches or condylomata of secondary syphilis, and the non-syphilitic, smooth white or pearly-white patches, for which Schwimmer was the first to propose the term *leukoplakia* and Hutchinson *leucoma.*

The French writers generally refer to the disease as *psoriasis linguæ,* or *plaques opalines.*

Hulke described a warty variety of the disease and applied to it the term *ichthyosis linguæ.*

The plaques opalines, or the mucous patches of secondary syphilis, are grayish-white and curdy in appearance, resembling the superficial corrosions caused by the application of the nitrate of silver to the mucous membrane; while the plaques of leucoplakia are usually thin, shiny, bluish-white, white, or pearly in color, sometimes having a yellowish tinge; but this, according to Butlin, is almost always due to the stain of tobacco or some other extraneous substance.

These two varieties of leucoplaques may be further differentiated by the slight elevation of the syphilitic mucous patches, the secretion of a thin watery fluid, which is the potent source of contagion, and their tendency to become painful and to ulceration; while in leucoplakia the patches are not elevated above the surrounding tissue, except in the warty form (ichthyosis); they are not painful except in the advanced stage of the disease; no secretion is present, and ulceration is not developed until the disease has taken on a malignant form.

To the latter variety of leucoplaques, the true leucoma or leucoplakia, the essayist desires at this time to call your especial attention, for the following reasons:

First. It is an exceedingly dangerous affection, often being the forerunner of carcinoma.

Second. It is a disease which, from its innocent appearance and the painless character of its early stages, is seldom recognized until the disease has progressed to a stage which renders a favorable prognosis exceedingly doubtful.

Third. That the disease seems, from personal observation, to be on the increase; and,

Fourth. The dentist, from the very nature of his specialty, is in a position to see and recognize the disease in its very earliest stages, and to warn the patient of his condition before it has progressed so far as to prove a menace to his life.

The disease in its earlier stages is much more likely to come under the notice of the observing dentist or stomatologist than it is of the surgeon or the laryngologist. As a rule, the patient does not consult a surgeon until the disease becomes troublesome; it may then have progressed so far as to give unmistakable evidences of degenerative changes of a malignant character. The dentist, therefore, should be so familiar with the characteristic features of the disease that he could recognize it at a glance; while it would be his duty to impress upon the patient the urgent necessity of consulting an oral specialist with a view of instituting measures calculated to arrest its further development, or for its complete extirpation.

*Etiology.*—The etiology of leucoplakia is by no means a settled question in oral pathology. Marked differences of opinion still exist among the very best pathologists as to the causative factors in the production of the affection.

The earlier writers looked upon the disease as a local manifestation of psoriasis; others that it was due to certain other forms of skin-disease, like zona (herpes zoster), and lichen planus; many have looked upon the disease as a circumscribed chronic inflammation of the oral mucous membrane, due to syphilis; and still others that it is a distinct affection produced by the local irritation induced by smoking or chewing tobacco.

Most modern writers look upon leucoplakia as a distinct affection, having no association with psoriasis in any of its forms.

*Predisposing Causes.*—Butlin agrees with Debove in the statement that there is in most patients some condition which predisposes to the disease. He says, "I suspect that the mucous membrane of the tongue in leucomatous subjects is from the first less thick and stable and more easily irritated than in the majority of persons. As some persons are known to have irritable and delicate skins, easily inflamed and prone to eruptions, and as some of these persons develop affections of the skin which are very chronic and difficult to heal, so I believe other persons have tongues whose mucous membrane is abnormally delicate, prone to chronic inflammation, and difficult to cure when the disease has been excited."

It has been suggested that chronic dyspepsia and the rheumatic and gouty diathesis might be a predisposing cause of the disease, but the evidence upon this point does not seem to be sufficiently strong to give any real weight to its consideration.

Sajous, however, says he has reason to think that gout is a cause of leucoplakia, for he has seen it in gouty women, who did not smoke and were not syphilitic.

Age and sex are both very important predisposing causes of the disease. Leucoplakia has been rarely seen in persons under twenty years of age, even in boys addicted to smoking; while upon the other hand it is rarely seen to commence in persons over sixty years of age. Women seem to be almost entirely exempt from the disease. Of the eight cases seen by the essayist all were in men, and occurred between the ages of forty and seventy-four.

Du Castel has reported a case in which the disease had existed since the age of twelve years in a man who had never used tobacco.

*Exciting Causes.*—Among the most common exciting causes of leucoplakia may be mentioned the irritation produced by the habitual use of tobacco, particularly smoking; the later recurring lesions of the mucous membrane due to the secondary manifestations of syphilis,—the mucous plaques,—acting locally upon the tongue or the buccal mucous membrane; the frequent use of undiluted spirituous liquors, the drinking of very hot fluids, or eating of very hot or highly spiced foods; the mechanical irritation of teeth roughened by the process of caries, fractures, or the accumulation of salivary calculus; the irritation from dental plates which are rough, ill-fitting, or made of material which is irritating to the delicate mucous membrane of the mouth.

Wallenberg is of the opinion that the use of tobacco is the most frequent cause of leucoplakia, and believes the disease is produced by the irritation of the volatile and empyreumatic oils liberated in smoking it. The essayist has no hesitation in expressing it as his opinion that the use of the pipe is much more dangerous to a sensitive mouth on this account than the smoking of cigars or cigarettes, as the pipe, from long use, is generally saturated with these oils, which often come into direct contact with the mucous membrane of the tongue, causing smarting and burning sensations, with more or less irritation. In the habitual smoker the irritation becomes chronic, producing a thickening of the epidermal layer and infiltration of the papillary layer with round cells.

*Symptoms and Diagnosis.*—Leucoplakia may be recognized by the presence of circumscribed or diffuse, smooth white, bluish-white, or pearly-white radiating patches appearing in varying numbers upon the mucous membrane of the cheeks, lips, gums, palate, or the tongue. These patches often coalesce to form larger ones. In their earliest stage they are not elevated above the surrounding membrane, are smooth and glistening in appearance, and range in size from tiny, irregularly outlined spots to large plaques the size of a silver half-dollar, or even larger. At first they are not sensitive, and on this account may exist for a long time without the knowledge of the patient. Many cases never progress beyond this stage. Others may slowly increase in size, thickness, and intensity of color, the plaque being slightly raised, the surface hard,—*cornified*,—and roughened. Accompanying this stage, especially when the disease is located upon the dorsum of the tongue, the patient will complain of a persistent dryness of the parts and inability to speak or use the tongue with comfort, except by frequent moistening of the mouth.

Later fissures appear in the tongue, and there is developed a smarting, burning sensation, as though the parts had been scalded. Alcoholic liquors, fermented beverages, acid fruits, highly seasoned or very hot foods or drinks, and chewing and smoking tobacco increase these sensations, and sometimes render the partaking of food a very great discomfort. Associated with this condition there is a tendency of some portion of the plaque to peel off or slough out, from time to time, leaving a reddened or a raw surface which is exceedingly sensitive and sometimes quite painful. Ulceration may follow and degenerative changes develop, ending in the formation of a carcinoma.

When the disease is in the tongue, warty growths sometimes appear in the leucomatous patches, which show a marked tendency under the stimulation of an irritant to take on a rapid form or carcinomatous degeneration.

Authorities are not agreed, however, as to the earliest developments of the leucomatous patch. Schwimmer and Barker described the earliest stage of the disease as appearing in the form of dark red spots or reddish patches, which later are covered with the white or pearly-white surface. Butlin, Debove, Nedopil, and nearly all other writers upon the subject describe the first stage as appearing in the form of radiating, non-sensitive white or pearly-white plaques; and your essayist desires to state that the testimony of his own observation corresponds with the latter conclusion.

Another fact should also be borne in mind in diagnosing this affection, namely: The progress of the disease is in many instances very slow, and may have the appearance of having reached the limits of its development, while occasionally the disease may disappear with advancing age. On the other hand, the disease which has seemed for many years to remain in about the same condition may suddenly assume a most rapid and malignant type of degeneration.

Shield reported a case of leucoplakia linguæ in a man seventy-three years old, for whom, two years before, one-half of the tongue had been removed for undoubted carcinoma, who gave a previous history of the presence of the disease,—"bad tongue,"—for more than twenty years.

*Differential Diagnosis.*—The affections which may be confounded with leucoplakia buccalis are the muco-plaques of syphilis and epithelioma. In the earlier stages of the disease such a mistake could hardly be made, but in the later period of the affection it might quite easily be confounded with syphilis or epithelioma. A three or four weeks' course of treatment with the iodid of mercury or potassium would clear up the diagnosis of the former, while in the latter it would be necessary to resort to the aid of the microscope for a positive diagnosis, even though there was present the clinical evidence of enlarged lymphatic glands.

*Prognosis.*—The interest in the prognosis of leucoplakia centers around the tendency or the predisposition of the disease to be followed by malignant degenerative changes, ending in the formation of carcinoma. That such a predisposition exists there is not a shadow of a doubt.

*Treatment.*—Leucoplakia of the oral mucous membrane is generally exceedingly rebellious to treatment, and quite often shows a marked tendency to carcinomatous degeneration; therefore the measures employed are *per force* largely those of palliation and heroic operations.

Those cases, however, which give a clear history of syphilitic infection may be benefited by a course of anti-syphilitic treatment, but it may be stated as a fact that up to the present time no drug has been discovered which, acting constitutionally, has any beneficial effect whatever upon the progress of the disease.

The *preventive measures* which may be instituted in the treatment of leucoplakia are the removal or discontinuance of all forms of chemical and mechanical irritation. Persons who suffer from an irritable and sensitive oral mucous membrane should avoid *chemical* *irritants* of whatever nature, particularly alcohol in any of its forms, acids, pungent condiments, very hot foods or drinks, and tobacco. In persons already affected with the disease such irritants stimulate its progress, and should therefore be strictly interdicted. It is much easier, however to advise a patient as to what he should do and what he should not do than it is to get him to follow your advice.

In the early stages of the disease—before it has caused any real inconvenience—it is very difficult to get a man who is in the habit of using spirituous liquors or tobacco to consent to give them up. He feels that you may be mistaken, or that you are magnifying the danger, and hence decides not to change his habit of living, at any rate for the present, or until he is convinced that your advice is correct. Perhaps he will consult some other professional gentleman, who disagrees with your diagnosis and laughs at your fears. This reassures the patient, and he goes on with his old habit of life for months, perhaps years; in some cases with impunity, in others with most disastrous effects to his comfort and his life.

The *mechanical irritants* which are most common in the mouth are usually associated with the teeth or with artificial dentures, such as carious cavities, jagged roots, fractured teeth, salivary calculus, rough or ill-fitting plates, or plates made of materials which are irritating to a sensitive mucous membrane. All such forms of irritation should be at once removed by filling the cavities, extracting the roots, giving appropriate treatment to the fractured teeth, removing the salivary calculus, and carefully polishing the surfaces of the teeth; while the irritating artificial dentures should be replaced by others free from these objections or discarded altogether. Too much stress cannot be laid upon these points as a safeguard to the patient against the development of the malignant form of the disease.

*Local Treatment.*—Nicholson, who believes leucoplakia to be zona of the oral mucous membrane, considers local applications of only temporary service, while the constitutional treatment for zona is often entirely fruitless. He advises, however, a trial of the tincture ferri perchlorid twenty-five to thirty minutes (1.3 to 2 grams) three times per diem, as in one of his cases it seemed to give relief from the burning pain, and improved the condition of the lingual epithelium in a remarkable manner, when all else had failed.

Rosenberger recommends the local application of pure balsam of Peru, painted upon the patches with a brush, and allowing it to remain in contact for from three to five minutes. The immediate effect is a slight burning sensation with an abundant salivation. These applications he advises to be made three times per diem. In thirteen cases so treated great relief was obtained. The patches, however, heal slowly, a year in some cases being required to produce a cure.

Leistikow advises the local application of the following paste:

| | | | | |
|---|---|---|---|---|
| Tenæ siliceæ, | 1.5 | grams | (24 | grains); |
| Resorcini, | 3.0 | “ | (48 | “ ); |
| Adipis, | 0.5 | “ | ( 8 | “ ). |

This he applies to the affected parts with a swab. From eight to fourteen days afterward a contraction or shriveling is observed, and a slightly inflamed condition of the mucous membrane, which by the application of balsam of Peru is brought to a normal condition.

Rosenberger reports a case of leucoplakia which had lasted for over seven years, and had resisted all the usual methods of treatment, in which the plaques disappeared in a few days after being painted with a twenty per cent. solution of the iodid of potassium.

In a case treated by the essayist the local application to the plaques and the denuded surface of the tongue of tincture of aconite and tincture of iodin, equal parts, every other day for two months, relieved all the symptoms except the abnormal dryness of the tongue, while the denuded part healed and was covered with healthy appearing papillæ. In the other four cases treatment was declined because of the apparent trivial nature of the disease to the minds of the patients.

*Palliative Treatment.*—Consists of the use of alkaline lotions or mouth-washes. Butlin recommends for this purpose, in the milder cases, bicarbonate of potassium, fifteen to twenty grains to one ounce of water, and in the syphilitic cases chromic acid, one to two grains to the ounce of water; or a five to ten-grain solution may be painted upon the plaques. Bicyanide of mercury is also recommended in solution of one to two grains to an ounce of water, and painted upon the plaques.

In the severer cases he recommends solutions of the bicarbonate of soda or of boric acid. He thinks mel boracis (honey and borax) is better suited to some cases than alkaline solutions, but, as a general rule, the alkaline solutions give greater relief in cases of leucoplakia of long standing. A trial of these various remedies is necessary in order to find the one best suited to the individual case.

*Surgical Treatment.*—In the severer forms of the disease radical operation is the only safe method to follow. The tendency of the disease to assume a malignant character should cause it to be treated as a malignant growth, and thorough extirpation practiced at the earliest moment. Temporizing by the use of caustics is worse than useless, and most authors deprecate their use for the reason that the irritation seems to increase the dangers from malignant degeneration.

In closing this somewhat lengthy paper, your essayist trusts that the presentation of such a subject has not seemed to you out of place, but rather in its right place; and that the suggestions herein made will have so interested you that in the future you will carefully observe the mouths of your patients with the view of studying this disease and reporting your discoveries. The disease is no doubt on the increase, if your essayist may judge from his own experience, for up to one year ago he had seen but three cases in all his practice; since this period he has recorded five additional cases.

### *Discussion.*

Dr. M. H. Cryer. Dr. Marshall has treated the subject of leucoplakia so thoroughly from beginning to end that he has left very little for us to say. There is only one point on which I might differ with him, and that is upon the question of its increase. I have no doubt that he has seen more cases during the last year than he has during his previous practice; I conclude this from my own observation, not of leucoplakia, but of other things. If some one would speak of a malformation of the upper or lower jaw, I should immediately go to my laboratory and find that malformation. The essayist, during the last year, has been thinking of leucoplakia, and has written a most complete paper on the subject, and he is consequently looking for cases all the time, and they have increased in number because he has watched for them. I have not been particularly watching for them during the last few years, and I have not seen more than I usually do—three or four in a year. While I was with Professor Garretson that was about the average number. Since I have been at the University of Pennsylvania I have had but two cases, for the reason that its department of oral surgery has not been so long established. There is one class of leucoplakia cases that has not been mentioned, and that is those where we have not an elevation of the parts, but a depression so that the plaque looks like an old scar or cicatricial tissue. The first case coming under my notice I asked my assistant what was the matter with the cheek, extending along its buccal surface and on the tongue; he said he thought some one had spilt upon it or burned the mouth with carbolic acid, as it had that white, glistening appearance.

As to treatment, I agree with the essayist exactly; you must treat it mildly and soothingly, or you must extirpate it. To treat it with caustics of various kinds is only to increase it, and is equivalent to pouring oil over a fire. There is one soothing medicine that Dr. Marshall did not speak of that is in great favor with me, and that is the subnitrate of bismuth. It is soothing to all the mucous membranes of the mouth, the nose, and the alimentary canal.

Dr. S. B. Palmer. I have observed several cases and have refused to prescribe, because I had not given the subject sufficient study to treat it intelligently. We have one thing settled, that we should not attempt any of the caustics, and we should point out to the patient in the best way we can the danger that might arise, putting them on their guard, and if they do not choose to take that advice the fault would be theirs.

Dr. Rhein. I have seen a few of those cases, and the difficulties which they present in regard to treatment have struck me as so great that I have often been puzzled in regard to them. The etiology of the subject, even after what we have heard from the essayist, is still unquestionably obscure. I have a case of leucoplakia at present under treatment, in connection with the physician of the patient,—a woman of about sixty years. As far as any syphilitic affection is concerned, we have found it impossible to trace the slightest cause. She is a married woman, with a large family of children and grand-children. The obstinacy of the plaques to respond to treatment has been most alarming to us. We have for some time abandoned the use of caustics. After we had attempted alleviation by the nitrate of silver, we perceived that instead of getting any benefit therefrom it seemed to add persistently to its irritation. I certainly have been well repaid by this visit to our meeting by hearing from the essayist the result of his study in regard to what has been most efficacious in the treatment of this disease, and especially the caution against the use of caustic treatment.

Dr. DEANE. I have had three cases that I can remember, and I found that the application of fluid extract of hydrastis has done more good than anything I ever tried.

Dr. JACKSON. It may not be out of place to mention the use of tincture of myrrh for apthous patches, ulcers, etc., in the mouth, for similar conditions for which physicians use nitrate of silver and caustics. I can cure cases with it that they are unable to cure. I have recommended it in hospitals and institutions where there are thirteen hundred children, and they find no remedy that will cure so many cases of cankerous conditions as the saturated solution of myrrh. Use it strong, and a continued application of from three to five minutes' duration.

Dr. S. FREEMAN. I would like to mention the case of a gentleman about forty-five years old, who was a great smoker, moderate drinker, and who was treated for ingrowing hair; hair was extracted from the lip and around the chin. The disease appeared upon the lips, on the gums, and also on the tongue. He had been suffering for one year and a half. He could not eat cheese or any spiced food. I treated this case with twenty grains of hydronaphthol to one ounce of white vaseline, with a sufficient quantity of oil of wintergreen added to it. He found relief within two weeks, and within one month the entire disease disappeared. I saw the gentleman last December, and he had no reappearance of the trouble.

Dr. LEROY. One case has come under my observation which has been treated, as Dr. Cryer has mentioned, with subnitrate of bismuth. It was not a thought of mine to use it, but the recommendation of the family physician of the patient. Under that treatment the case progressed very well, the condition being entirely relieved, the fissures in the tongue disappearing,—a condition that I did not expect to see. The tip-end of the tongue, however, remained so excessively sensitive for three or four months that the gentleman became alarmed, thinking there was some more radical trouble. However, we eventually were able to control that by discontinuing all treatment. The mouth was in a diseased condition, with the existence of pyorrhea. The roots that were exfoliated were removed, and some crowns put on others. Another condition existed, which seemed to increase the excessive irritation,—acidity of the secretions, with consequent erosion of the teeth. A number of gold fillings had been placed, years ago, on the approximal surfaces of most of the teeth at the sides of the mouth; erosion was so great on the morsal surfaces that the fillings projected quite a distance from the cavities. Those were ground down, and the cavities that existed filled. The subnitrate of bismuth seemed to cause a positive restoration of the healthy conditions of the mouth, the mechanical treatment being simply auxiliary.

Dr. HOFHEINZ. The question of local treatment has been discussed, but at this point the question of etiology arises. I do not believe that if the disease can be traced to a syphilitic diathesis, local treatment alone will suffice. I do not think the mucous patches can be cured in the mouth with caustics or the milder remedies without a systemic treatment by potassium iodid. As I remember, the patches themselves are usually manifestations of tertiary syphilis. The leucoplakia caused by local irritations, such as smoking or other irritations in the buccal cavity, can of course be thoroughly treated by local applications. The same differentiation must be made in the treatment as we apply in pyorrhea alveolaris, where we have simple and complex cases.

Dr. DEANE. Have you ever tried the iodid of starch? It is made in a powder, and can be dusted on the parts by the patient.

Dr. MARSHALL. No, I have not. I have been exceedingly gratified, to say the least, at the reception my paper has had at your hands. In replying to the remarks that have been made by the various gentlemen, I would say in regard to Dr. Cryer's description of another condition which has the appearance of being depressed, rather than elevated, that I have never seen such a case. The usual condition of leucoplakia is without any elevation at all. It is only in the later stages of the disease, when the tissues begin to break down, that we have induration and elevation of the patches.

If you look at the case illustrated by Chart 1 you will see that it looks glossy on the surface. I had it made so, because that was the appearance in the mouth. There was no roughness to the tongue, while in the other case, Chart 2, the tongue had a rough feeling. Case No. 1 was in the very early stage of the disease, and case No. 2 was in a later stage of the disease. The point that looks somewhat yellow was, I think, caused by the use of tobacco. There was great sensitiveness, especially on the tip of the tongue,—so much so that the gentleman had trouble in eating and drinking. Perhaps the cases that Dr. Cryer refers to may be old syphilitic cases, where there has been a contraction of the tissues after ulceration, which would naturally make a depression.

Fluid extract of hydrastis has been mentioned as being a remedy. I am very glad of this suggestion, because if one remedy I try does no good I try another. Tincture of myrrh I do not think will have any effect on true leucoplakia, although in cases of aphtha, the ordinary canker mouth, which looks something like this condition, it is very beneficial.

Dr. Freeman referred to a case where he used hydronaphthol. I should be a little afraid of it. It is very irritating to a raw surface in the strength he mentioned. My first experience with it was in the case of an injury which a young lady received in riding her bicycle when I was in the country. The only antiseptic I had was hydronaphthol. I thought I would dust the parts with hydronaphthol, and I had a slough as large as a silver dollar. I should be afraid to use it, because it has such a caustic effect and produces a sloughing of the parts.

Dr. Freeman. If you add vaseline it will not have that effect.

Dr. Marshall. In replying to Professor Hofheinz as to the etiology, I would say the opinion of various writers brings it to about this point: In an equal number of cases we can trace the disease to syphilis and to the use of tobacco. In any case of leucoplakia resulting from syphilis, we ought to get beneficial results from a resort to the constitutional treatment of syphilis,—by mercury or potassium iodid. He made the suggestion that possibly this was a tertiary condition of syphilis. I am inclined to think in some cases it is, although usually tertiary syphilis attacks the bones. Where we have a positive history of syphilis, formation of the mucous plaques, and their gradual healing in later years, this cicatrix which has been formed by the ulceration may show irritation again as a tertiary symptom. I do not feel certain about it, however, as I have not had experience enough to form a definite conclusion. We should be thoroughly sure we are right before we make a dogmatic statement.

I want to call attention to Chart 5. This illustrates the case of a gentleman seventy-four years old. It has the appearance of being in the early stages of the disease. If it is, I should not expect that this patient would die from carcinoma resulting from this disease. We believe that carcinoma is the result of embryonic inclusion of epithelial tissue, or it is the result of inclusions from traumatic conditions. The majority of carcinoma and also of sarcoma are the result of inclusions during fetal life, particularly around the mouth and the face, where there are so many fissures that are gradually closed in the formation of the face. Wherever there has been an inclusion of connective tissue, of periosteum, out of their normal place we have the development of sarcoma, and wherever epithelial tissue has been misplaced carcinoma is the result whenever the proper stimulus is applied.

(To be continued.)

## TRI-STATE DENTAL MEETING OF THE MICHIGAN, INDIANA, AND OHIO DENTAL ASSOCIATIONS.

(Continued from page 657.)

Dr. Eliza M. Mosher, Ann Arbor, Mich., read the following paper:

### The Dentist's Posture at the Operating Chair; Its Influence upon the Health of the Body.

It is our privilege this afternoon to consider together a subject of a good deal of practical importance. The profession of dentistry has become so influential and calls to itself such numbers of our best young men, that anything connected with the work which tends to weaken the body or interfere with its symmetry exerts a far-reaching influence.

In order to decide whether the dentist's posture at the operating chair is harmful, it will be necessary to consider the human body for a few moments from the standpoint of its mechanics. So considered, it consists of a pedestal, the pelvis, upon which is poised a long and flexible upright column, the spine. To this column of bones, loosely bound together by ligaments and muscles, weights are attached, the heaviest of which is the chest and its contents. The arms are weights attached to the spine through the scapulæ and clavicles; lastly, the head, more or less heavy, is poised upon the summit of the column, with freedom of movement in all directions.

To add to the difficulty of elevating and maintaining such a jointed and weighted mass in a perpendicular position, the pelvis has a pair of slender, jointed columns, the legs, connected with it, which it can swing beneath itself at will, thus forming a secondary base. Muscle force lifts this articulated mass of bones into the upright position, and by the same force its weights are adjusted in a manner to enable it to make use of the ever-active force of gravity, to support itself thereby; this done, muscle force ceases to act, to a greater or less degree, until a change of position is to be made, when a suitable readjustment of weights again enables it to utilize the force of gravity. From the moment the child first raises its head from its mother's arm to old age the human body, during its waking hours, is thus balancing its weights, in an effort to minimize the expenditure of energy, and so to conserve vital force.

The trunk is largely dependent upon the position of its base, the feet, and its pedestal, the pelvis, for its power to perform muscular work with facility. The shape of the trunk also changes with the varying positions of its base. Postures often assumed and movements repeated permanently recast the body outline, so that in its shape one can easily read the trade-mark of a man's occupation.

Has the human body a *normal* posture, standing and sitting, one which is natural to it, and in which the work of the body can be carried on with less effort than in any other? Undoubtedly it has. The heart and lungs work unceasingly from birth to death, and that posture must be the best and most natural which gives to these tireless workers the greatest freedom of movement. Furthermore, if the posture which is most advantageous to these organs is the best also for all the other organs and muscles of the body, we may assuredly conclude that such a posture is the one to which the body should habitually return after movement,—the one indeed in which muscular work should be performed as far as possible.

The largest space for heart and lungs in standing is obtained by placing the weight of the body upon the feet *in front of the ankles*, and upon the pelvis *when it is held in strong anterior obliquity.* In this position the sternum and spine are widely separated, and the heart and lungs not only have ample space, but they hang evenly upon their supports. The abdominal cylinder is enlarged equally in all directions, thus making room for its contents without encroaching upon the pelvic space or making undue pressure upon the blood-vessels and nerves which lie along the spinal column. The plane of the inlet of the pelvis, in this posture, is placed *obliquely* upward, so that the contents of the abdominal cylinder are not pressed downward into it both by muscle force and by gravity. This is the posture of strength and dignity, the posture of command, as well as the one which most conduces to health and symmetry.

The normal posture of the body in sitting is the same as far as the obliquity of the pelvis is concerned.

In either sitting or standing the body maintains equilibrium by forming a strong anterior curve in the lumbar region, with a comparatively slight compensatory curve in the region of the shoulders. The head, when it has no weight below which it must balance, is free to poise easily in its place upon the summit of the spine; if, however, the equilibrium of the body be disturbed by removing from the spine the weight of one arm (by supporting it), the head is promptly removed to the opposite side, to serve as a counter-weight. If a foot be thrust outward or backward, the body loses its grip upon the cable of gravity; muscles now assume the task of holding it, until a counter-weight can be adjusted to restore equilibrium through gravity. The spine changes its curves, and with this the body shape undergoes modification, with loss of space for important organs, and unequal muscle tension.

Having thus reviewed the mechanism of the body, we are prepared to consider intelligently the question of the healthfulness or otherwise of the dentist's posture at his work. He stands much of the time with the weight of his body upon one foot; one arm is supported by the chair, the other is held free, that it may transmit power to the hand, which lightly or forcefully manipulates the instruments by which he performs his important work. In this posture his head is ever seeking a position in which to balance the arm or foot thrown outside the base, that the body may equilibriate; much of the time, however, it is inefficacious, and he is obliged to maintain the body in posture for work by muscle force alone; this causes a good deal of expenditure of vital force. He moreover uses in his work, hour after hour and day after day, the same muscles. His head more or less continually seeks the same position away from its natural place at the summit of the body. His spine makes the same rotary twist until the ligaments used upon the stretch so continually become overstretched, and those used short lose their power to work at greater length, and thus the spinal rotation becomes permanent. One shoulder (more often the left) is held low, while the other is forced upward by the working arm; in time one shoulder becomes permanently low, and the body line from axilla to hip shorter than its fellow; the body also becomes short anteriorly and proportionately lengthened upon its dorsal surface. By this means, the abdominal cylinder is encroached upon by the drooping ribs, and its contents are forced downward into the upturned pelvis. The lung space is diminished and the heart is crowded, while the blood-current moves more or less unequally in its more or less interrupted channels. While the body may adjust itself to such changed conditions, we cannot doubt that it suffers loss, both in its symmetry and in its power to resist disease.

In view of this, will you permit me to make the following recommendations, which, if carried out, would, I believe, materially lessen the danger which attends the dentist's work.

1. That you shall find positions in which the patients can be placed, which will permit the operator to conserve vital force by utilizing the force of gravity more continuously than has been done in the past.

2. That students in dentistry shall, as far as possible, be taught to use both hands equally in the manipulation of instruments; or, if this cannot be done, that a more careful division of labor between the right and left hand shall be made, in order that a greater variation in body posture may be possible.

3. That students in dentistry shall be *required* to take exercises (either in gymnasium or elsewhere) throughout their course of study, which are calculated to develop the muscles used least in dental work. Great care should be taken to untwist the spine, which tends to rotate outward on the right side.

In closing, it gives me pleasure to present to you some special exercises which Miss Alice G. Snyder, Director of the Women's Gymnasium at the University of Michigan, has selected especially for dental students and practitioners.

Miss SNYDER followed Dr. Mosher's lecture with a demonstration of the exercises.

*Discussion.*

Dr. WHITSLAR. I have been much interested in the lecture of Dr. Mosher. I believe such subjects are to us occasionally of more benefit than that of continual studying how to put in an amalgam filling, or filling a root with amalgam. I can only add a few words in connection with the mechanism of the body, and relative to the spinal column and the head. Compared to the lower animals, the head of the human being is balanced in the center by the spinal column. Animals which walk upon all fours and whose heads are supported at right angles with the spinal column have the head also supported by a ligamentum at the back. The spinal column in man is different from that of the lower animals. The spinal column in man is not a straight line, but it has four curves, and these are all for the special purpose of helping to support the head and the thorax and the internal organs within it in a vertical position. This is assisted in the back by certain muscles, helping to retain the body in an upright position, and all these have to do with the maintenance of the body normally, as we have been shown, and to develop us as perfect individuals. Now, the health of any human being depends, of course, upon the health of the organs, that all functions of the body may be in perfect condition, and if we deviate from that we lose the normal tone of the nerves, muscles, and vascular tissues, then the body must suffer and we lapse into what is termed neurasthenia, a loss of nerve tone. The question arises to us many times, Is the dentist's occupation a healthful profession? I maintain it is healthful in a relative sense. Take a pitcher with a handle which is cracked; that pitcher may be utilized to carry water in it for a number of years if it is only filled to a certain point, but when filled beyond that point then the handle breaks and it is no longer useful. It is the same with our own bodies in the practice of our profession. There is a limit to our ability and our endurance, and that is one reason why I believe that women in dentistry have no place. She has not the physical ability to stand hard drudgery and the great mental strain that man has ability for.

Now, a dentist who is capable in all directions is one who has his body in healthful condition and whose physical functions are correct as well as his nervous tone, his digestion, etc. How can we overcome the idiosyncrasies and the disabilities among us as workers in this line? We have exercises which will assist us, and within the past few years we have had given to us a chair which is of great assistance to us. Now, with this chair we are enabled to accommodate the patients to ourselves, as well as accommodate ourselves to them.

If you will observe the older men of the profession, those who work on the old Archer chairs, which could not be raised up and down to any degree, they are the ones who have had to suffer from the ill effects of stooping over, while the younger men, now coming into the profession, are the ones who are keeping their shoulders level and necks fairly straight. You know the foot-rests of the modern chairs are so made that they may be raised up and down; and we must accommodate our patients to ourselves as a matter of health protection. If we raise the back of the chair, we put the patient's head in a normal position, or a little more than a normal position forward. This we do sometimes in operating upon lower teeth, but if we desire to operate upon the upper teeth, in order to bring the head back and to throw the teeth into position for our easy access, we must lower the back and lower the head-rest. Then, too, we have as a valuable adjunct the head-rest, which enables us to throw the head on either side, and it helps us in that way to gain access to the mouth. Then we have, too, the usage of the mouth-mirror and also the stool. While I have never used it, I have observed by the demonstration this afternoon that the stool is a very healthful thing to us. Of the 4,000,000,000 people upon the earth, about one-fourth die under the age of six years, and about one-half of them die before the age of sixteen years. These figures are stupendous, and yet with all that, the survivors—those who live beyond that age—have a great tendency to crowd their organs out of position, and yet they try to keep well and live to a good old age. Now, I undertook last week to get a little data, which I did in a small way, to illustrate this point. I examined the back numbers of the DENTAL COSMOS, extending over a period of several years, and picked out at random thirty-five cases of dentists who had died. Reading their obituaries, I find that the average length of life of all those men was sixty-two years, their ages varying from twenty to ninety-nine years. That gives us a little satisfaction in knowing that while we have an unhealthy profession in some respects, yet we live on an average longer than do physicians and many other classes of people. It is a well-known fact that dentists are not listed as serious risks with the insurance companies.

Now, as to the exercises which have been shown, I think they are very excellent. I think many times if we go in our laboratories, when our legs are tired, and give a few little motions up and down, as has been demonstrated, we would stir up the blood and we would go back to the chair and perform our work with a great deal more vim. The only disagreement I have with the essayist upon these exercises is that they are a little too tame for many of us, and we want to get out upon our bicycles and take other exercises. Bicycle riding, exercise out in the air, is more invigorating, renewing our blood, etc. One of the most beneficial exercises I believe we can enjoy, one which trains the eye and the muscles, is that of fencing. I think it is a most excellent one for the dentist. While fencing, his body is not only supported as by the pedestal at the hips, but it is supported upon the legs, and he is able to throw himself into any position, either backward or forward. It is an exercise which throws all the muscles in every direction; it gives him a little excitement, which he is likely to desire.

Dr. SMITH, of Toledo. Mr. Chairman, I want to emphasize what Dr. Whitslar has said with reference to the value of this paper, or rather lecture, and to say that it has well repaid me for coming. One word with reference to the right hand. The doctor said the student ought to be taught the use of both hands. I have observed those beginners in dentistry who use both hands equally well have a great advantage, but in my judgment it is too late to begin when the young man comes to the dental college. The mother is at fault. It is too late, in my judgment, to develop both hands alike if the mother has punished her child for using the left hand. But it would be a splendid thing if the child should be taught the use of both hands equally well, and would have great value in our profession. I do not believe the freer use of the right hand is hereditary at all. I should like to have the opinion of the essayist on that point.

Dr. MOSHER. To some extent I think it is.

Dr. TAFT. The matter of position and its influence upon the muscles is so apparent that hardly anything need be said in addition to what has been said upon that point. But there is this to be taken into account, which perhaps would come to every one on studying this subject, and that is the interference that is made by these false postures upon the functions of the body. If you make a pressure, for example, upon the digestive viscera, it necessarily somewhat interferes with its proper function, its particular work; then you suffer, of course. If you contract the chest you interfere with the function of the lungs, and the breathing then is not what it ought to be, and there are many times when they are so cramped, and for hours and hours together, and dentists talk of practicing standing at a chair eight or ten hours a day, and much of that time in a false posture, in a posture that makes contraction of the chest and pressure upon the abdominal viscera and contractions around about the heart, perhaps impingement upon it, so that none of these organs perform their work as they ought to do. Then what is the result? Then come these disturbances that are so frequently found, much less frequently found now than they used to be before the introduction of certain appliances that are now available, one of which is the mallet, another the dental engine, another is the rubber-dam, and so on. And the facilities that attend the use of these enable the dentist now to proceed with his work with much less embarrassment than it did thirty years ago. I can remember thirty or forty years ago, one man broke down in a few years by assiduous, persevering practice; men who had full practice, the majority, would fail in health and break down. I could name you numbers now thirty years ago who failed, and some of you will recall many instances of this sort who failed in their strength, failed in the efficiency of their work. This is a point that ought to be looked to,—the interference of the functions of any part of the body. The liver may be pressed upon by a cramped position. If the heart and lungs are interfered with, the whole organism necessarily suffers. Everywhere, every part of the body, every fiber in it, suffers necessarily, and under these circumstances the nervous system is not fed as it ought to be, not enough nutrition is carried to it, and its functions cannot be exercised, and so a general breakdown comes by and by. Before the engine was brought in, if you will pardon personal reference, I suffered with just this trouble, and expected to die years and years ago from the condition that was brought on by the false positions, and by the labor of persevering work continuously kept up all the while. It is true young men nowadays do not suffer as they did in years gone by because of these things, and because the subject has been a little agitated, referred to occasionally; but I hope from this day on that this matter will be in the minds and on the hearts of our profession more than it ever has been, and that every one will stir himself to arouse an interest in this question. It is one of the most outreaching questions, one of the most important questions with which the dentist has to deal. If the dentist's strength is impaired, his abilities are weakened so that the patients suffer. They do not receive the service they would have under a good physical condition of the dentist, and it is a subject that ought to be agitated in all our schools. The young men ought to be trained from the very day they go into the schools, and especially the day they go to the chair, to avoid these false positions and stand erect and keep the body in normal positions as far as possible. Arrange the patient so that this can be accomplished; so that you can reach the point of operation readily and easily without cramping the body, without curving the neck to a break-neck position. Changing the position of the patient frequently is a point. As was referred to by somebody, formerly we had chairs that were capable of only being changed a little in position, but that is all changed now. Chairs are now made so you can bring them in a horizontal position, and that is important in many cases, and you can put them erect, or put them at any angle, or turn them from one side to the other while you are standing. It takes but a light pressure of the toe for a moment to raise or lower the chair a little, and so change the position of the operator and give relief. Who has not had relief by changing, after working thirty or forty minutes in one strained position, by lowering the patient a little, or tipping him to this side or that side, and thus feel entirely relieved?

Then let us begin to train our young men,—begin at the very earliest opportunity and discuss this subject and talk about it before them, and see that they observe this matter of proper posture and proper movements in their operations at the chair. It is suicidal for a man to go to the chair and stand in a fixed position for an hour or two hours. Change your position frequently, and you will derive a vast benefit. By the way, the stool ought to be used by every dentist. Sit down awhile, and get up and stand on one foot and the other, and then on both feet, and get the various positions that will obtain rest, and avoid any prolonged position that will make you tired when you rise up.

In regard to this matter of the ambidextrous hand; the left hand ought to be used, of course. Dr. Smith thinks they cannot be made ambidextrous, but in the last six months I have become able to do much with the left hand that I could not do before. I find it is becoming more facile, and many things I do just as well now, though it is only six months since my attention was called to it, and it relieves my right hand a good deal. Some of us will make more rapid progress than others. It is a fact that many of us have never had really but one hand in many respects, and I do believe very much improvement can be made by the great majority, perhaps by all persons. Make the left hand do whatever you can, and you will find very great advantage, I think, from it.

Dr. Albrecht, of Indianapolis. Mr. Chairman, the suggestions of Dr. Mosher have presented themselves, I presume, to all of us quite frequently in our lives while we are in trying positions. We may not have given the subject so much thought and reflection, and consequently we may not have anticipated the results which may follow. We all have a warning before disorder occurs. The warning is in that we get tired. And in reference to this warning feeling, I would like to utter three suggestions that I have practiced myself for a number of years. When I felt tired in my chest with several hours' work, or a day's work, it was the warning. My chest had been cramped in forcing the muscles of the chest because the work required it. I got a wind instrument. It was the bassoon. You may get an oboe, you may get a clarionet, you may get a brass instrument. With playing it I had to expand my lungs fully and permit a small amount of air to gradually escape from the lungs. In ten minutes' practice on the instrument my tired feeling was gone. I found it was a very easy way of curing my fatigue, and perhaps the overcoming of a deformity of the ribs. Dr. Anderson suggests a quick expulsion of the air. From personal experience, I can say that the playing of a wind instrument, where I had to inflate my lungs to the fullest extent and permit the air to gradually escape, gave me relief.

Another thought is that of getting tired in the neck. We have had exercises suggested to us this afternoon which are absolutely correct, only I wish to tell you of a different way I got relief, and for a good many years, by sleeping in bed without a pillow. It forces my head back and keeps the spinal column absolutely straight. That relieves the tired feeling in the neck, and I do not get so stoop-shouldered as many are already.

Another thing, to relieve the muscles of the arm: while I rest in my bed I lie with one arm under my head. When I have rested that way I change about. I offer these suggestions, as they come in line with Professor Mosher's paper.

Dr. Clayton, of Indiana. There is one thing which has not been touched upon in regard to the position of the body. I defy anybody to stand erect with the modern heel as we wear it to-day. I do not care how much you study, you cannot get in normal position, upright, with the modern heel. You cannot do it. There is an effort all the time for the spinal column to get at right angles with the foot. If you put the heel on, you get out of balance in spite of you. I have had some experience in military affairs, and I believe every young man ought to buy and study the exercises known as the Tactics of the American Volunteers, which are much the same as those used this afternoon, only I think those shown should be for us much more violent. Here is one excellent exercise for expanding the shoulders and chest, jerking the hands back in that way and throwing them forward [illustrating], blowing your lungs full of air with all the force you can put in, like that. Another good one is to stretch down until the fingers touch the floor. The bicycle was mentioned this afternoon; I think the way the bicycle is ridden by the average person that it is the most abominable thing ever invented. A man cannot ride on all fours and be healthy. A man should sit upright, as the Almighty intended he should. If the scorcher insists, let him go on, and the sooner he scorches himself out of existence, the better for his race.

The Chairman. I shall have to give Dr. Mosher an opportunity to close the discussion, as it is getting late.

Dr. Mosher. I have only a word to say in closing the consideration of this subject. Perhaps you did not observe, as I hoped you would, that most of the exercises suggested are corrective exercises. They are exercises to do one or another special thing. I want to say that while the violent exercise is all right, it does do what some one said a little while ago, it stirs the blood; yet the exercises and the postures which have produced the changes, the deformities perhaps, have been very gentle and steady, often exercises with the mallet or with other of your instruments,—that gentle exercise has been quite sufficient to enlarge all those muscles around the right arm; quite sufficient to do that, and then equally gentle exercises are quite sufficient to correct them. It is not necessary to take those hard, violent exercises. And, by the way, I want to warn you against going into such vigorous work suddenly. I do not think it is the best thing. I think in order to do vigorous work after quiescence one must come up slowly to that work, and must never do it suddenly. I must still say that I believe the best exercises for overcoming the harm that is done by the overtaxing of one set of muscles is to give some certain work to the other set, the opposite of the ones used. The bicycle ridden correctly is a good thing. It does help to balance up the body, strengthens the spine; it tends on the other hand, too, where the posture is forward a little bit, it tends to hang the head upon the muscles which hold it to the spine, just as the dentist's work tends to drag his head forward. The other day in the dental department at Ann Arbor I said to my friend who was with me, looking over the records, I said, Where are the heads? We looked down across the room and there were no heads to be seen. There were trunks, but no heads. The heads were all out of sight. Now, that should be overcome. If that posture is necessary, work should be done to strengthen the muscles which are overstretched.

A vote of thanks was unanimously tendered to Dr. Mosher and Miss Snyder for so satisfactory a presentation of the subject.

Then adjourned to 8 P.M. same day.

(To be continued.)

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## UNION MEETING OF THE MARYLAND STATE DENTAL ASSOCIATION, WASHINGTON CITY DENTAL SOCIETY, AND VIRGINIA STATE DENTAL ASSOCIATION.

(Continued from page 782.)

### FIRST DAY—*Morning Session* (Continued).

DR. H. JEROME ALLEN, Washington, read the following paper:

### THE USE OF FORMALIN.

The substance now known synonymously as formaldehyd, formic aldehyd, methyl aldehyd, or oxymethylen, is a gaseous body formed from methyl (wood) alcohol by oxidation.

Formalin (which is the trade name adopted by the Schering Chemical Works to designate their product) is a saturated watery solution of the gas formaldehyd, and occurs as a neutral, colorless, volatile liquid of a pungent odor and sharp taste, miscible in every proportion with water and alcohol.

Paraform (polymerized formalin, paraformaldehyd, paraformic aldehyd or tri-oxymethylen) results from a simple evaporation or heating of formalin, and appears as a white, indistinctly crystalline powder, which is stable under ordinary conditions, and is made into tablets and sold in that form for disinfection.

Paraform is volatilized by heat and is soluble in hot water, the solution possessing the characteristics of ordinary formalin.

The gaseous compound was first discovered by Von Hoffmann in 1867, who produced it by passing the vapor of methyl alcohol mixed with air over platinum powder heated to redness. Later it was and is still produced by the action of silent electric charges on a mixture of hydrogen and carbon dioxid.

Its germicidal properties remained unknown until discovered by Loew in 1888. Since then a host of authorities have recognized and investigated its properties, and have, as a rule, pronounced it far superior to any general disinfectant now in use.

"Formaldehyd has the chemical property of uniting with sulfureted or nitrogenous products of decay, fermentation or decomposition forming true chemical compounds which are odorless and sterile, and these compounds are in most cases actually antiseptics themselves.

"It is from this property of combining chemically with albuminous or nitrogenous bodies that formaldehyd derives its germicidal and bactericidal power; since bacteria and micro-organisms generally are not only albuminoid in character, but their food is mainly albuminoid, and when formaldehyd is present it combines with both the bacteria and their food, thus destroying them as well as the possibility of their existence." (Lilly.)

In this fact lies the surpassing value of formaldehyd over such disinfectants as corrosive sublimate, carbolic acid, lysol, etc., for albuminous matter is at once coagulated by contact with these agents and the resulting antisepsis is more or less superficial, while the formaldehyd solution, being possessed of a chemical affinity for albuminoids, thoroughly impregnates (and consequently sterilizes) all such substances with which it comes in contact.

Partly as a natural sequence to this property is developed its power of hardening and preserving animal tissue; converting soft tissues to a hard, leathery mass, dependent upon the strength of the solution and the time of action.

This effect is due, as before stated, to its penetrating action, whereby it readily unites with the albuminoid substance in the protoplasm of the cells and checks all putrefactive changes permanently in dead tissue, and for the time being checks the growth of cells in living tissue.

The truth of the first assertion has been proven beyond doubt by innumerable experiments; the truth of the second assertion appears to be proven by the following experiment:

"By repeatedly painting the ear of a rabbit with a concentrated solution (40 per cent.), in ten days the ear will fall off as smooth as if cut off, and without bleeding. Quite similar is the effect upon the human epidermis. The application of this action of formaldehyd solution to surgery is obvious." (Alexander.)

Another valuable property of formaldehyd is its absolute lack of toxicity when in contact with living tissue in almost any strength. Even paraform, which contains one hundred per cent. of formaldehyd, is perfectly harmless if accidentally swallowed, inasmuch as its conversion into the gaseous state is so slow at the temperature of the body that it does not act at all injuriously upon the mucous membrane of the alimentary tract. The possession of these properties by formaldehyd should give it the first place in the list of dental antiseptics and disinfectants. Already its use in the profession as a general disinfectant has become quite general within the past two years.

It is the active principle of all the lately introduced mouth-washes and antiseptic solutions, and their proven superior germicidal properties are due to the presence of this agent.

Its remarkable property of existing in three available forms—gas, liquid, and solid—adapt it readily to all purposes and classes of disinfection, and it bids fair to become the universal disinfectant of the near future. A few of its dental applications may be enumerated as follows:

For occasional use in the office to destroy all noxious odors, disinfect the draperies and furniture, and purify the atmosphere, nothing is better than a Schering formalin lamp, which disinfects the premises by the production of formaldehyd gas by the thermal vaporization of paraform. The ease with which the disinfection can be accomplished is one of its principal recommendations.

In the evening before leaving the office place from ten to twenty paraform pastils (according to size of room) in the receiver of the lamp, light it, close the premises tightly and let them remain so until the next morning, when by opening the doors and windows all odor of the disinfectant rapidly disappears, and the office and its exposed contents have undergone a complete sterilization.

For the rapid and thorough sterilization of dental instruments, perhaps no other method is superior or even equal to that employed in the Schering formalin sterilizer. It consists of an air-tight tin cabinet of a capacity of about one cubic foot. The interior is arranged to accommodate a formalin lamp and three shelves of wire netting which allows the gas to reach all parts of the instruments placed upon them. The sterilization is accomplished by the vaporization of paraform in the receiving cup over the lamp, and an exposure of ten to fifteen minutes suffices to absolutely disinfect the contents of the cabinet. This method is surely the closest approximation yet to an ideal embodying the principles of Koch,—viz, "the absolutely certain destruction of all pathogenic organisms in the shortest possible time, at the least expense, and with a minimum of injury to the object of disinfection."

In operative work it has an undeveloped field of application, and no time should be lost in pursuing an active investigation of its potentialities in order to find their limit, and the amount of dependence to be placed thereon.

For sterilizing cavities before filling, it is valuable in a twenty per cent. solution, particularly if the cavity is large or any softened dentin is allowed to remain as a protective covering to the pulp.

When the pulp is exposed a weak solution (about two per cent.) should be used to flood the cavity before capping.

After the arsenical application is removed from devitalized pulps, they may be hardened to a leathery consistence and removed intact by enlarging the exposure and sealing in a pledget of cotton saturated in a twenty per cent. solution, for three to six days.

In the treatment of putrescent root-canals is formaldehyd particularly valuable. A twenty per cent. solution should be worked into the root until all fetid odor is completely destroyed. The contents should be thoroughly removed, and the root can be filled immediately by incorporating a minute quantity of paraform with the powder of the cement used in the filling.

Another method of treating a putrescent canal with either a blind or a fistulous abscess at the apex is to clean out the contents thoroughly with a twenty per cent. solution, and then seal in a small quantity of paraform. The paraform is vaporized so slowly at the temperature of the body that the canal and the apical tissues are kept in a continued aseptic condition, with the resulting death of the micrococci and their spores.

In personal practice two applications at intervals of a week have sufficed to give most encouraging and apparently lasting results. Several chronic abscesses of years' standing have healed up with surprising rapidity under this treatment.

It is to be hoped that this valuable agent will soon be assigned to its proper position in the dental pharmacopœia.

### *Discussion.*

Dr. H. B. NOBLE had had but little experience in the use of formalin. The paper would seem to teach that it is one of the best germicides, but it produces pain sometimes in its use, and we should be careful, as it is a powerful stimulant when applied to the soft tissues. He had used it in a few cases, but had found it caused so much pain that he felt best to be cautious with it.

Dr. A. W. SWEENY, Washington, was much pleased with the paper. He had not had extended experience with formalin and could not decide as to the advisability of its use, but the paper was useful in bringing the subject before the profession and spreading the knowledge and discussion of formalin so that its advantages and disadvantages would be generally known. Every new thing is worthy of attention and study, and all study of new remedies and methods works toward real advance in practice. The only way to determine the value of anything new is to have some one carefully prove it, and the only way for such work to benefit the profession is to make it public.

Dr. J. B. RICH, Washington, said Dr. Allen's paper introduces to us one of the most valuable agents that has been used in the profession. He had used formaldehyd two years, and no substance which he had used before fills the purpose of treating dead dental bone like it does, and for antiseptic purposes we have nothing nearly its equal. It is quite astounding that the dental profession has not used it more generally. It is no longer an experiment, as it has been used very largely and its qualities fully described. In conditions of dentin where the pulp has been decomposed, we have no antiseptic that is so good. It is not a coagulant, but is a very powerful agent, and of course must be used with care. He prefers the form called paraform; it is produced by the evaporation of formalin, and should be put in the pulp-chamber and sealed up; it dissolves very slowly, and its action is more certain than is that of formalin. The pain produced by its use is not very serious.

The disinfecting property of formalin is more perfect than that of any other substance. If a room infected with bed-bugs or other insect vermin is closed as tightly as possible and paraform, evaporated by means of a suitable lamp, is left in the room for thirty-six hours, not a single insect would be left alive. The reason is that when evaporated by alcohol the vapor has the same specific gravity that the air has, and permeates wherever the atmosphere goes. If a little particle of paraform is put in a pulp-chamber and sealed up for a few days, the canals will be entirely purified and the tubuli of the tooth will be open to receive any substance one may wish to apply. It may be used as a mouth-wash in canker of the mouth in a solution of 1000 to 1, and as an eye-wash in proportion of 4000 to 1, which will be found sufficient to produce a tingling sensation in the eye and the lids.

Dr. ALLEN said that as a general rule the stronger the solution the greater the pain, and if the solution was not unnecessarily strong there need be no pain except in cases needing heroic treatment. The use of formalin in dental practice has not been investigated thoroughly, and he thought the profession should give it attention as an addition to their remedies.

The subject was passed, and adjournment was had till eight o'clock, the afternoon being devoted to clinics.

**(To be continued.)**

## AMERICAN MEDICAL ASSOCIATION—SECTION ON STOMATOLOGY.

(Continued from page 763.)

### SECOND DAY—*Morning Session.*

THE Section was called to order at 9.30 A.M.; Dr. W. K. Sinton, president of the Colorado State Dental Association, in the chair.

Dr. E. S. TALBOT, of Chicago, gave a lecture, illustrated by the stereopticon, on "The Stigmata of Degeneracy," and Dr. W. G. A. BONWILL, of Philadelphia, described at length his system of measurement of the teeth and jaws. There was no discussion of these subjects, and adjournment was had till 2 P.M.

### *Afternoon Session.*

The Section was called to order at 2.30 P.M.; Dr. G. V. I. Brown in the chair.

Dr. J. S. Marshall, of Chicago, read a paper on "Leucoplakia."*

*Discussion.*

Dr. A. H. Peck, Chicago, commended the paper as being of great interest, as it deals with a subject which has not attracted the serious attention of dental practitioners. He was impressed with the systematic manner in which the subject was presented, including the appearance of the diseased spots, the etiology, progress, and treatment of the disease.

Dr. A. E. Baldwin, Chicago, thought the paper would be of permanent value to the profession, and useful for reference and guidance in the treatment of these cases. He would observe more carefully mouths which come under his treatment in the future than he had in the past, and when such indications as the paper described were found would better understand what they meant. He thought that irritation arising from smoking was more serious when cigarettes were used than when either pipe or cigars were, because tobacco comes in closer touch with the tissues.

Dr. E. S. Talbot said that he had seen cases of leucoplakia in his practice and read about them, but had never received any enlightenment about its etiology. There are some strange things about it. It is produced by local and constitutional causes, by tobacco, alcohol, rough teeth, or by syphilis. With such very diverse causes it was remarkable that the result should be the same. In cases where the cause seemed purely local he thought there must be a predisposing constitutional cause, and believed that systemic treatment would be advisable in all cases.

Dr. G. V. I. Brown, Milwaukee, said to him there seemed to be several points of particular interest in the paper. Anything is important that leads to investigation into what may be called an intermediate condition between benign and malignant disease. There are often such conditions where the progress from benign to malignant may depend upon something apparently unimportant, and yet where the malignancy when developed is of character so destructive and hopeless as to be appalling. This truth had recently been impressed upon him more than ever before, because in a large dispensary practice of which he had charge he had seen more instances than he would probably have seen in private practice. Dr. Marshall warns us against the use of tissue-destroyers in the treatment of this disease. We often destroy tissue without proof that the new surface exposed would be better than that removed. He had come to rely more upon mild treatment. Frequent application of milder remedies is better than fewer applications of more severe remedies. In many conditions of the system the mucous membrane of the mouth becomes covered with secretions which will render inoperative any remedy that can safely be applied. To overcome this it is of course necessary to clean thoroughly the part affected, and as far as possible the whole of the mucous lining of the mouth, before making any application. With this clean surface provided, the milder remedies will be quite as efficacious as stronger would be otherwise.

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*This paper was also read before the Dental Society of the State of New York, and an abstract will be found at page 836 of the current number.

Dr. TALBOT asked what would be the use of cleaning the surface when these plaques were usually under the mucous membrane?

Dr. BROWN said that the remedies would have less resistance to overcome if the secretions were removed. In some cases he thought it advisable to remove the plaques by use of the knife, but not by the use of medicinal applications which would destroy the tissue.

Dr. HAYDEN, of Colorado Springs, thought it was especially advantageous for dentists who, practicing away from the centers of population, have no access to the large institutions, where opportunity for study of the rarer diseases is given, to have their attention called to these diseases, so that, even though they should not feel qualified perhaps to treat them, they could at least recognize them and understand the importance of advising treatment.

Dr. J. TAFT, Cincinnati, said that there were some very peculiar features about this disease. One is that it is rarely or never found in a woman. It seems to be confined to men. This seems to indicate that it depends on something peculiar to the male. If it is brought on by syphilitic poison, why does not this cause bring it to women who are affected by syphilis? Tobacco is used almost exclusively by men, and it would appear certain that the poisonous influence of tobacco is responsible for much of the trouble such as is described in the paper, and also for epithelioma of the mouth. He had seen many cases and many operations for epithelioma of the mouth, and in almost every case the patient was a user of tobacco. The conditions described in the paper seem also to owe their origin to tobacco, though the use of spirituous liquors seems to be a causative agent. Another question is, how deeply are the tissues affected by this disease. In many cases it is superficial and subject to treatment, but the more malignant it becomes the deeper it extends. We must then observe and ascertain how deeply the affection has gone when we determine upon treatment. The penetration would depend upon the character of the irritant and the character of the tissues. Many persons seem to have a predisposition to malignant growths. In such cases there would be a graver prognosis than in those who naturally resist such encroachments. We should determine as far as possible the history and general condition of the patient. In all cases it is probable that systemic treatment would be indicated to get the body in as good a condition as possible.

Dr. MARSHALL, in closing the discussion, said that Dr. Talbot had raised the question as to whether the disease may be either constitutional or local. Authorities are about equally divided. Some think it is purely local, as is psoriasis or hives; others that it is a manifestation of syphilis. Those who think it local consider that tobacco is the only cause of it. As stated in the paper, there are two distinct varieties of the disease, the true leucoplakia and that which comes from syphilis; the latter is easily cured by medicine which cures the specific disease. The other variety is very difficult to cure. The tissues are in a low state of vitality, which is brought about by irritation. We know that Cohnheim, in treating of epithelioma and cancer, thinks they are the result of an infolding of cell-tissue in intra-uterine development. He believed that in the cases of leucoplakia where there are irritations and healings there are some of these cells, and they develop into true carcinoma and epithelioma. The question was asked whether all cases of leucoplakia develop into cancer. No. Some cases run on with little change till old age; others run on for a long time, and then break down and carcinoma occurs. As to sex, only two cases have been reported in women, and they were both syphilitic. The ulceration is always superficial until the later stages. As to location, of eight cases he had seen, none of them had been on the palate, the fauces, or the tonsils. They had been on the tongue, the cheek, the buccal aspect of the gums, or the alveolar border where the teeth had been lost. The most frequent place was where the tobacco-smoke enters the mouth from the pipe. He believed that tobacco was usually the cause of the disease.

The subject was passed, and Dr. W. H. Hall, of Denver, read the following paper:

### Only a Baby Tooth.

Reference is not here made to any particular baby tooth, nor to any particular baby's tooth, but to the deciduous or temporary teeth as a class.

Interest in the subject which furnishes the topic of this practical treatise antedates considerably the discovery of the *first* baby's *first* tooth by the proud new parents.

Its importance does not begin nor end here, nor is it confined within the limits of baby's and childhood's tender years, as we expect to prove. An extended theoretical discussion of the proper treatment and best material for filling roots and crown of a devitalized molar would come as far short of interesting our medical brethren as would a learned paper on typhoid fever and its treatment the Dental Section of this assembly. Therefore, this homely topic shall be given a plain, practical, but limited consideration. "Only a baby tooth" is expressive of insignificance, but not in that sense do we use it here, now, nor elsewhere never. It is sometimes given professional utterance in just that sentiment, however, but no one in this body of our profession's representatives was ever guilty. The culprit lives and practices over in the next county, and never attends a meeting of the city, county, state, or national medical or dental society. He stays at home, hoping to capture patients, while the "up-to-date" brother attends the convention feasts. He has no need of the society, and *vice versa*. Did you ever hear of his saying, "Oh, it's only a baby tooth. We'll pull it out and some day a new tooth will grow in and take its place"? Why not say, "Only a kid, and it's not important what kind of treatment is given"? In my imagination I can almost see the dim outlines of a gallows rising to receive such criminals in practice. Perhaps if outraged nature fails to fill the vacancy this culprit has made he can supply the loss with a lovely glistening gold tooth, for nowadays, you know, you can get a gold tooth, whether or not you stick your tongue in the vacancy,—and for five dollars, too,—but then Dr. P. says they are brass gold-plated.

I would not wish to convey the idea that I think temporary teeth should never be extracted. Not extraction but premature extraction is the criminal act. I rather enjoyed the enviable reputation gained in my practice in Ohio, of "never extracting children's teeth." This, however, was the frequent parental decision, but in practice was not adhered to when judgment dictated otherwise.

It always takes more time to explain to parent or accompanying guardian why an aching tooth should not be at once removed than to perform a dozen such surgical operations, with the apparent result, after all, that the effort was "love's labor lost." The impression which prevails to a great extent among parents (it certainly does not exist in the professional ranks) that the temporary teeth have no roots and should be extracted when they ache, because a new one will come in after awhile, anyhow, is an error which should be corrected as speedily as possible. The mission of the physician and dentist is not of a remedial character alone, but prophylactic and educational also. The value of the temporary organ and its important office during that comparatively short period,—the few years of child life,—should be an oft repeated lesson, until parents are impressed with their responsibility, and that the period of first dentition, the care and attention necessary for their preservation until nature's physiological process accomplishes their removal, is one of great importance.

A neglected, abused, or maltreated first dentition often causes a sad disfigurement of the permanent set. A premature removal of the temporary teeth is a more frequent cause of irregularity in the permanent set than a tardy removal. This is a valuable lesson the dental profession is teaching, and we are persuaded that it is not altogether in vain. Because a temporary tooth aches it must not be concluded that extraction is the only treatment, nor simply because it's "only a baby tooth" that it's not worth while to give it any other consideration. True, it is much easier for the operator to extract it than to give it treatment, and parents think only of such prompt and heroic measures as will end the ache at once and forever. (How sad that prevention was not thought of months, yes, even years before.) The family physician is often sought in such cases, and yields to the desire for extraction, thereby doing violence perhaps to his conscience and better judgment.

The conscientious dentist (and physician) will not only protest against premature extraction, but will follow his protest with a kind and intelligent explanation of the proper treatment, with good reasons therefor, and then if necessary positively decline to be a party to the "slaughter of innocents."

The preservation of the temporary teeth is important for several reasons.

*First.* They are needed for masticating purposes, and must be kept in good condition for the proper performance of that function. If badly decayed, mastication cannot be properly performed, indigestion and dyspepsia result, with consequent general systemic disorder.

*Second.* They contaminate the breath, and this fetor enters the lungs; the vitiated saliva mixed with the food passes into the stomach; such conditions we contemplate with disgust and horror.

*Third.* Decay involves the pulp, causing pain and suffering to the child, with more or less general nervous disturbance; finally death of the pulp, resulting sooner or later in suppuration, adding another objectionable element to the contents of the stomach. The death of the pulp portends further trouble in the future because the physiological process of resorption of the root ceases, and these roots, minus crowns, sometimes remain for several years deflecting the permanent teeth from their course, or crowding them from their position in the arch.

*Fourth.* The temporary teeth retain the fullness of the alveolar process and maxillary development.

*Fifth.* They are needed as wedges to support and retain in its own place each contiguous tooth until the approach of the teeth of replacement.

The evils of a premature extraction of the temporary teeth are,—

*First.* Possible irregularity of the permanent teeth.

*Second.* Absorption of the alveolar process and consequent contracted condition of the maxilla by reason of arrested development, thus permitting the contiguous teeth to move toward one another, closing the space, resulting in disalignment, impaction, or prevention of eruption of the permanent tooth. Especially important is the second or posterior temporary molar in retaining the first permanent molar in its place, and also the temporary cuspids in retaining the permanent bicuspids in their places. The premature loss of the temporary cuspid is perhaps the more frequent cause of disfigurement and a more serious irregularity than any other with which the dentist has any experience.

Finally, premature extraction may cause the destruction of the germ of the permanent tooth. For example, the pulps of the *first* and *second* bicuspids are formed about the fifth or sixth years, so a removal of the anterior or posterior molars at this period may result in the serious injury of the permanent tooth.

What, then, shall be done for the children and their deciduous teeth? No single, definite plan, of course, can be pursued and attain the object sought,—viz, the preservation of these teeth until the proper time for their removal by nature's process, and with the assistance of dental science.

Several things are essential,—viz, to assist weak nature if her resources are impoverished, restrain her if she seems violent, and correct her if her course be erratic. Hygienic science is well recognized as an essential factor in the health of the body, and dental hygiene is the key which will unlock the door to the temple of health science for the benefit of baby's "first teeth."

Without this aid, the man of dental science is waging a stubborn and endless battle in the effort to preserve what might have been prevented. It is not by good guessing that our profession has arrived at an understanding of these things, but by the sure findings of scientific investigation. Our thought is not so much of hygienic influences and the benefit to these dental organs, after their "line-up" in the mouth, but of the importance and value of such treatment during the periods of gestation and lactation and later periods of development.

It is not our purpose to consider in detail that strange and interesting operation in the human economy, the process of the development of the teeth, but when we know that the evidence of a germ, which eventually becomes a tooth, has been observed as early as the sixth week of embryonic life, with a knowledge also of the various stages and changes during the periods of development, we may reasonably expect that the influence of hygienic treatment during those periods will be manifested in a better quality of tooth-structure. The papillæ or dental germs of the temporary teeth appear, as reported by various authorities, about as follows: The anterior molars, sixth to seventh week of embryonic life, followed by the cuspids, incisors, and posterior molars up to the tenth week.

The eruption of these teeth occurs as follows: Beginning with the incisors at about seven months of age, continuing with the entire set until the twenty-fourth month, when the posterior molars appear.

Therefore from the sixth week of embryonic life when the dental germ is first discovered, until past two years of age when the last temporary molar is in its place, embraces a period of about three years, during which time the temporary teeth are undergoing the developing and calcifying or dentinifying process. Any diseased condition of the system which disturbs nutrition affecting or preventing the assimilation and appropriation of the lime-salts, those elements which build the osseous system, will produce manifest defects in those tissues. As we nourish the body so we can nourish the teeth. Therefore let parents, physicians, and dentists take more interest in this subject and study for the preservation of the temporary teeth by a hygienic regime, which tends toward the prevention of a low grade of tooth-structure.

Here the physician's opportunity exceeds that of the dentist, but when the time and opportunity for the practice of these principles have passed, so far as benefit to the temporary teeth is concerned, then as cavities of decay appear they should be filled. The selection of the kind of material for filling is governed by circumstances, but oxyphosphate of zinc, or tin, are generally preferred.

In conclusion, we hope that an appreciative public will more and more come to understand that not every practitioner of dental science and art is living simply to "pull" and "plug" teeth; and further, that members of our profession will feel that dental instruction and education should not be entirely confined within the walls of our professional schools.

(To be continued.)

## NATIONAL DENTAL ASSOCIATION.

THE first regular meeting of the National Dental Association was held in Creighton Medical College, Omaha, Nebraska, commencing Tuesday, August 30, 1898.

### FIRST DAY—*Morning Session.*

The association was called to order by the president, Dr. Thomas Fillebrown, of Boston.

The visiting delegates were welcomed to the city by the mayor, Hon. Frank N. Moores. Mr. Moores, in his speech, which abounded in humor and pleasant hits, tendered the keys of the city to the association.

The president briefly returned thanks for the keys, and called upon Dr. James Truman, of Philadelphia, to respond formally.

Dr. TRUMAN gracefully and eloquently voiced the sentiment of gratification of the members for their hearty welcome.

The session was devoted mainly to routine business.

On motion of Dr. C. N. Peirce a telegram was ordered to be sent to Dr. George H. Cushing, secretary of the association, expressing the regret of the members on account of his inability to be present.

The secretary read a communication from the Washington City Dental Society, stating that Dr. John B. Rich's name had been stricken from the roll of membership.

Dr. J. D. PATTERSON, from the Executive Committee, called attention to the fact that several delegates had been sent in whose reception would be in violation of the constitutional provision that no one could be received as a delegate, who "since August, 1875, shall have entered the profession without first having graduated at some reputable dental or medical college." It was voted to observe the law, but the privileges of the floor were granted to all those who had come to the meeting under a misunderstanding of the law.

A communication was read from Dr. R. Ottolengui, of New York, requesting the adoption by the association of a resolution in support of the movement to have the patent laws amended to prohibit the issue of patents for methods of curing disease. It was referred to the Executive Committee.

Dr. J. N. CROUSE, from the Executive Committee, offered the following as the unanimous report of the committee:

> WHEREAS, The Supreme Court having already declared all such patents as are contemplated in this move to amend the patent law invalid, which makes all such movements unnecessary; and
>
> WHEREAS, The constant agitation of this question is detrimental to the best interests of organizations now in existence: be it
>
> *Resolved*, That the National Dental Association now in session disapproves of any further work in this direction, and recommends that the whole question be dropped as unwise and unnecessary.

The report was adopted by a unanimous vote.

The president, calling Vice-President B. Holly Smith to the chair, then read the annual address, which was entitled, "The

Value of Organization." An abstract follows: Organization is essential to the success of any movement in which the combined effort of several individuals is desired. It makes the collection a unit, and holds the special privileges of the individual subject to the will of the body for the good of the whole. Nations, peoples, and communities require formulated rules for their government and control. An association of persons for the promotion of scientific investigation demands the same organization, and the value of the organization depends upon the faithfulness with which it represents the most advanced thought of the body adopting it.

This necessity of humanity has firmly established three kinds of laws,—the statute, changeable at will; the organic or constitutional, requiring a more complicated proceeding to change it; and the common law, which is deduced from generally accepted principles and not the result of legislative enactment. Laws must change, unless society is stationary. So every advance in morals or intelligence, the law in its own way and time is sure to adopt.

Applying these principles to our own professional organizations, we see that our organizations of the past were as good as the material of which they were composed would afford; our present association will be no better than the knowledge, culture, and enthusiastic efforts of its members will make it; constitutions will not furnish brains, culture, or application; standing rules will not compel research or write papers.

The address touched upon the proposed amendments to the constitution changing the name of the association, and upon the adoption of a code of ethics.

The things most essential to the success of our association are brains, education, application, enthusiasm, and an unselfish devotion that will bring and lay on the altar of science all the sweet incense of the best efforts of every member. Business must be conducted on the selfish principle, but if honestly and fairly applied no one will be wronged or injured. Professional relations must be governed by an entirely unselfish principle, and to him whose life is controlled by it, regulated by good common-sense, no loss will come. It will be a grave mistake for this association to allow business ethics and business interests to again enter into the conduct of its affairs. Picture for a moment a majority of this body being pecuniarily interested in the profits that can be made on the sale of goods to his brother practitioners. Or this member being appointed on a committee because he holds a large block of stock. Or another being elected president because he can influence large sales of dental goods. The bare mention of the condition seems sufficient to prevent the possibility of its obtaining.

The main features of this organization are the same that have enabled such bodies to do the best work of which they are capable. As we progress in scientific attainment and interest, changes will be found necessary and desirable. One of them may be the reference of all matters of business to a representative council.

The two distinctively new features of our present constitution are first, the creation of the divisions of the East, West, and South, and the holding of the meetings in them consecutively, and second, the provision for the formation of branches. The first cannot fail to be productive of good, especially in awakening a wider interest in and increasing the attendance at meetings, and in guarding against sectional control. Through the second we may reasonably expect many to become interested who otherwise would not.

It may be an open question whether delegates are not too much restricted as to number, as also whether it would not be better to provide for the election of the president from the division in which the next succeeding annual meeting is to be held.

The value of professional organization is not simply in bringing together the great, the good, and the wise, to exchange congratulations upon what the few know more than the many; but in that the many may meet the few, and that knowledge, culture, and refinement, and a true professional spirit may be more widely diffused and better appreciated. Greatness is attained by the acquisition of knowledge. Honor is accorded to those who impart their knowledge the most freely. To the writer the future of the National Dental Association seemed to be especially bright and encouraging. Its formation had combined the professional interests of North America.

The address was referred to a special committee, consisting of Drs. H. A. Smith, Frank Holland, and Clark L. Goddard.

Adjourned to 7.30 P.M.

At the evening session of the first day's proceedings the three amendments proposing changes in the name of the association, which came over from the last year, were taken up and laid on the table.

At the same session Dr. A. W. HARLAN, Chicago, offered the following:

> WHEREAS, It is well known that an International Exposition will be held in Paris during the summer of 1900; and
>
> WHEREAS, Provision has been made for the holding of an International Dental Congress in Paris, and committees have already been appointed to organize such a congress, and it is the wish of said committees that the National Dental Association appoint a committee to co-operate with these committees in making the congress a success; Therefore,
>
> *Be it Resolved*, That a general committee of fifteen be appointed by the president to co-operate with the general committee in Paris. Such committee to have power to add to its number, not exceeding twenty-five names in the United States, and that said committee, when organized, be empowered to adopt rules and regulations such as will insure the success of the congress. The present president and vice-presidents of this body shall be members of this committee. After this committee has organized, by the selection of a chairman and secretary, its acts shall be final, and after the close of the congress said committee shall present a report of its work to this association.

The resolutions were adopted unanimously, and the following were announced as the members of the committee:

A. W. Harlan, Chicago; A. H. Fuller, St. Louis; H. J. McKellops, St. Louis; J. Taft, Cincinnati; H. A. Smith, Cincinnati; W. W. Walker, New York city; James McManus, Hartford, Conn.; W. C. Barrett, Buffalo; T. W. Brophy, Chicago; B. Holly Smith, Baltimore; W. E. Griswold, Denver; C. L. Goddard, San Francisco; L. L. Dunbar, San Francisco; Henry W. Morgan, Nashville, Tenn.; Frank Holland, Atlanta, Ga.; Edward C. Kirk, Philadelphia; J. D. Patterson, Kansas City; Thomas Fillebrown, Boston; Thos. E. Weeks, Minneapolis.

The following were elected officers for the ensuing year: H. J. Burkhart, Batavia, N. Y., president; S. H. Guilford, Philadelphia, vice-president for the East; Thomas E. Weeks, Minneapolis, vice-president for the West; B. Holly Smith, Baltimore, vice-president for the South; Emma Eames Chase, St. Louis, corresponding secretary; Geo. H. Cushing, Chicago, recording secretary; Henry W. Morgan, Nashville, Tenn., treasurer; J. Y. Crawford, G. V. I. Brown, C. S. Butler, Executive Committee.

Niagara Falls was selected as the place for the next meeting.

The time for the next meeting was changed, by unanimous consent, to the first Tuesday in August, 1899.

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## MINNESOTA STATE DENTAL ASSOCIATION.

THE fifteenth annual meeting of the Minnesota State Dental Association was held in St. Paul, beginning September 6, 1898. The following officers were elected for the ensuing year: Dr. L. P. Leonard, Waseca, president; Dr. G. S. Munson, St. Paul, vice-president; Dr. H. L. Cruttenden, Northfield, secretary; Dr. H. M. Reid, Minneapolis, treasurer; Dr. C. H. Goodrich, St. Paul, chairman executive committee; Dr. W. N. Murray, Minneapolis, master of clinics.

The next annual meeting will be held at Northfield, subject to the call of the Executive Committee, which probably will be some time in August.

H. L. CRUTTENDEN, *Secretary,*
Northfield.

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## AMERICAN DENTAL SOCIETY OF EUROPE.

AT the recent meeting of the American Dental Society of Europe the following officers were chosen for the ensuing year: Dr. L. A. O'Brian, president; Dr. G. C. Daboll, vice-president; Dr. William A. Spring, secretary; Dr. S. S. MacFarlane, treasurer.

The next year's meeting will be held early in August, 1899, at Brussels, where our American colleagues will be very cordially welcome.

Further particulars may be obtained of the president, Dr. O'Brian, Dresden, or of

WILLIAM A. SPRING, *Secretary,*
38 Reichs str., Dresden.

### READING DENTAL SOCIETY.

The Reading Dental Society for Reading and Berks County was organized at Reading, Pa., May 31, 1898, and a constitution and by-laws were adopted. The following officers were elected to serve six months: C. V. Kratzer, president; H. W. Bohn, vice-president; C. R. Scholl, secretary; E. Tate, treasurer. Executive Committee, A. B. Davis, P. Mogel, W. H. Scholl, chairman. The society meets monthly.

C. R. Scholl, *Secretary.*

## DENTAL COLLEGE COMMENCEMENTS.

### UNIVERSITY OF CALIFORNIA—COLLEGE OF DENTISTRY.

The sixteenth annual commencement exercises of the College of Dentistry, University of California, were held at Berkeley, on Wednesday, May 18, 1898, at ten o'clock A.M.

The number of matriculates for the session was fifty-eight.

The degree of D.D.S. was conferred on the following graduates by L. L. Dunbar, D.D.S., dean of the college:

Henry G. Allen.
John H. Atkins.
Perley B. Aiken.
Mabel L. Beers.
Jean Cline.
John H. Cooper.
Homer T. Craig.
Charles H. Du'Bois.
Andrew L. Edwards.
Weston B. Estes.
Hartley W. Gottenberg.
Norman S. Halsey.
William D. Henderson.
Andrew J. Hiniker.
Ira L. Hinckley.
Perley C. Jones.
Minnie E. Jordon.
Charles F. Lemmon.
William R. Linscott.
Flora M. MacDonald.
Louis P. Mariotte.
Charles L. McPike.
Hubert O. F. Menton.
Charles L. Morey.
Frederick B. Pearce.
Jerome B. Painter.
Helen A. Parker.
Armstrong C. Pratt.
Alfred C. Rulofson, Jr.
George E. Schillig.
Franklin T. Scott.
Frank C. Sellwood.
Ernest K. Sisson.
Thomas M. Smith.
Walter J. Smyth.
Joseph M. Stalder.
George G. Stanford.
Charles J. Stephens.
George H. Stewart.
William A. Walden.
Frank D. Watkins.
Caleb R. Wilcoxon.
Jean I. Worthington.
George H. Wymore.

## DENTAL SOCIETY ANNOUNCEMENTS.

### NORTHEASTERN DENTAL ASSOCIATION.

The fourth annual meeting of the Northeastern Dental Association will be held in Hartford, Conn., October 19 and 20, 1898.

The Executive Committee have arranged for a fine program of papers and clinics; also extensive plans have been made to have a fine exhibit of dental goods and medicines. A large gathering is desired and confidently looked for.

Edgar O. Kinsman, *Secretary,*
Cambridge, Mass.

### NORTHERN ILLINOIS DENTAL SOCIETY.

The Northern Illinois Dental Society holds its tenth annual meeting at Rockford, October 20 and 21, 1898, and a program is in course of preparation.

Jas. W. Cormany, *Secretary.*

# EDITORIAL.

## THE OMAHA MEETINGS.

It is a matter of regret to many who are interested in the success of our new National Association that its first meeting was held under circumstances which necessarily detracted much from its success. It is further a matter of surprise that the results accomplished were as satisfactory, considering the adverse influences which hedged it about both at the time of the meeting and for some time previous thereto.

It was not until a very short time before the date fixed for the meeting that the place where it was to be held was definitely decided upon, and pending that decision all sorts of rumors gained currency as to the availability of the place finally selected. Its geographical location, its hotel accommodations, its climatic conditions, etc., were all called in question, and created a widely-felt uncertainty as to the desirability cf Omaha as a meeting place. These doubts certainly deterred many from undertaking a trip which involved a considerable financial outlay and an amount of fatigue and inconvenience which few care to assume during the summer vacation period unless a compensating inducement in the way of a pleasant and profitable gathering is offered.

Someone blundered in the management which permitted the foregoing state of affairs to occur. It was not until the August issues of the dental journals had appeared that the official decision as to the place of meeting was announced, or until official assurance was given that delegates and visitors would be properly provided for during the time of the meeting. Nor was sufficient notice given of the character of the program provided, as the official document was issued only at the last moment. As a result, the attendance was small, lamentably so in comparison with what it should have been under proper management, to the lack of which and nothing else the meager result is to be charged. If a proper place of meeting is selected, a good program provided and ample notification given as to all its details, a good attendance will result. Dentists will not barter the certainty of a much-needed rest and vacation after a season of arduous labor for an uncertainty in the matter of a dental meeting to which they are invited long after the disposition of their vacation time has been provided for, and especially when the inducements offered by the dental meeting are discounted by the possibility of much personal discomfort and expense. Right here it is customary to offer sentiments of professional duty as the warrant for sacrifices of that character, but professional duty involves also the duty of maintaining one's physical and mental standards by a proper summer vacation. Therefore if the summer gathering of our national body is to be a success, it must not be made an arduous task, but a pleasure and means of recuperation to those who attend it.

We believe that a lack of interest in our national organization cannot be fairly deduced from the results of the Omaha meeting, but it will surely not do to repeat the experience if that interest is to be kept alive. The literary features of the meeting were, on the whole, good. Although the number of essays read was comparatively small, some of them possessed exceptional merit and contributed much to the interest of the meeting.

Two actions of importance to the profession of this country were taken and are published in detail elsewhere in this issue,—viz: First, the resolution creating an American committee to coöperate with the general committee having in charge the holding of an International Dental Congress during the International Exposition to be held in Paris in the summer of 1900. This is an important step, and one which will afford opportunity for the better adjustment of some of our international relations affecting dental education and dental practice.

The second feature of importance was the action of the Executive Committee relative to the proposed patent-law amendment making impossible the issuance of patents upon methods of treating human diseases. The resolution embodying the views of the Executive Committee with respect to that movement is a curiously worded statement which seems to need further elucidation, for the reason that it does not make clear the fact that the alleged decision of the Supreme Court declaring all such patents invalid will also and necessarily prevent the Patent Office from issuing them and so make an end to litigation concerning them. Nor does the wording of the resolution make it clear that the committee intended that the interests of the dental profession took precedence in their minds over "the interests of organizations now in existence," but *vice versa.* A little more light on the real motives of the Executive Committee in this regard would be welcomed in view of the importance of the principles at stake.

The outlook for the next meeting is more favorable. Niagara Falls, which is the place selected, is always popular; its natural attractions are world-famous, its summer temperature delightful, and its facilities are ample. With these points settled, it only remains for those having the meeting in charge to prepare an attractive program and announce its details at least two months prior to the date of meeting, and a good attendance will be assured.

The annual meeting of the National Association of Dental Faculties was, all things considered, a success. Of the forty-four colleges in its representation, thirty-eight sent delegates. Four new schools were admitted and one withdrew, making the total number at present holding membership in the association forty-seven.

Two important advancements were made affecting the rules governing the college course: first, an increase in the length of the course was made obligatory by the adoption of a resolution requiring an increase in the length of each of the three years' terms from six to seven months, or the addition of a fourth term of six months, as a minimum standard for the total length of curriculum.

The second advance step was the adoption of a regulation making the standard of preliminary educational requirement equivalent to attendance upon two years of the high school course. Both of these rulings to go into effect for the session of 1899-1900.

It is a matter for congratulation that this action has at last been formally taken by the Faculties Association, and that they have thus in large degree effaced the wrong done at the previous meeting in practically lowering the preliminary standard from the point at that time attained. We hope to see the minimum standard of preliminary educational requirement for dental students placed at the point of high school graduation, which is none too high, and where it logically belongs until our educational system has developed to the degree that we can prescribe more accurately the details of a correct educational curriculum naturally leading up to dental professional study.

We have for some time maintained and have elsewhere called attention to the fact that the kind of education best adapted for preparing a student to enter upon the study of dentistry is, or should be, special in character; that his education, even though it be as broad as possible, may yet not comprise those factors best suited to his needs as a dental student. As the official minimum standard of preliminary education is gradually approaching a reasonable maximum of what a fair average preliminary education for entrance upon dental study should be, it becomes more imperatively necessary that dental educators should recognize the importance of the qualitative factor as well as of the quantitative factor in our preliminary educational requirement.

Surely not all kinds of preliminary education are best suited for preparing a student for the study of dentistry. Let us therefore seek out and add to the curriculum of preparatory study those branches best adapted for the purpose in view, and at the same time eliminate those which are useless or relatively so, in order that in time it may be within the power of dental college authorities to prescribe and promulgate a system of preliminary training which shall be best fitted for preparing students to enter upon the course of dental professional study. This is a matter clearly within the function of the National Association to inaugurate and perfect, and could well occupy time and energy less profitably expended at present.

# OBITUARY.

## DR. GARDNER QUINCY COLTON.

Dr. Gardner Quincy Colton, through whose instrumentality "nitrous oxid gas" was first used in dentistry, died August 9, 1898, in Rotterdam, Holland. He had been on a visit to Europe, and was about to return home when he succumbed to a complication of diseases brought on by old age.

Dr. Colton was born in Georgia, Vt., February 7, 1814, and was the twelfth child of his parents. He first learned chair-making, and when twenty-one years old came to New York, where he followed his trade, studying all the time, however, in the hope of becoming a physician. In 1842 he entered the College of Physicians and Surgeons, and later studied in the office of the late Dr. Willard Parker.

Two years after he began to deliver lectures on physiology and chemical phenomena. He had acquired a knowledge of electricity, a science then in its infancy, and invented an electrical motor which he exhibited, illustrating his lectures with it. This motor is now in the Smithsonian Institution in Washington.

In 1844, when he was lecturing in Hartford, Conn., and showing the effects of nitrous oxid gas on persons to whom he administered it on the stage, Dr. Horace Wells, who became one of his subjects, was impressed with the possibility of using the gas in dentistry. He told Dr. Colton of his idea, and the next day he had the gas administered to him and a tooth extracted.

Dr. Colton went to California in 1849, where he searched for gold and practiced medicine among the miners. He was the first man in California to be appointed a justice of the peace. With a competence he returned to the East, and went about the country lecturing, telling his audiences of the anesthetic properties of the "laughing gas." In 1863 he established an office in the Cooper Institute, New York city. A few years later, when he visited Paris, he had attained a record of twenty thousand administrations. Returning to America, he opened offices in Philadelphia, Boston, Baltimore, and several other cities, and through his energy and success the use of nitrous oxid gas as an anesthetic became thoroughly established.

Dr. Colton was also an author and a Shakespearian scholar. He published a brochure on "Shakespeare and the Bible," and wrote upon the discovery of anesthesia. C. S. McNeille, D.D.S.

# DR. EMIL ARMAND DE TREY.

Emil Armand De Trey, D.D.S., died at Zurich, Switzerland, August 4, 1898, of apoplexy.

Dr. De Trey was born at Vevay, on Lake Geneva, Switzerland, in 1846. At twenty years of age he began the study of dentistry at the University of Berne, where he continued for one year. He came to America and entered the Pennsylvania College of Dental Surgery in 1867, graduated with the degree of D.D.S. from that institution in February, 1868, afterward returning to Berne and continuing his studies at the university, receiving the diploma from that institution the following year. In 1870 he began the practice of dentistry in his native town of Vevay, where he continued in practice for twenty-three years, afterward removing to Basel, conducting a practice in that city for a little over three years.

He was a member and one of the founders of the American Dental Society of Europe; also a member of the Swiss Odontological Society. He was known as a skilled operator and an ingenious practitioner, and more recently attained additional prominence by his discovery of the special form of sponge gold known as "Solila gold," and his special instruments and methods for the introduction of it as a filling-material.

Dr. De Trey was married to Mlle. Leah Pittet, of Vevay, by whom he had two daughters and six sons, all of whom survive him. One son, Dr. Victor De Trey, is a practitioner of dentistry in Basel, and three of the brothers are at present dental students.

At a recent meeting of the American Dental Society of Europe, held in London, the following resolutions were adopted:

"Whereas, We have during the session in London of the American Dental Society of Europe heard of the sudden and unexpected death of Dr. E. A. De Trey, of Lausanne, Switzerland, and

"Whereas, Dr. De Trey was one of the founders of the American Dental Society of Europe, and has also been held in great honor and respect not only by the members of this society but by the dental profession at large for his estimable private and professional qualities;

"*Resolved*, That the American Dental Society of Europe herewith extends its sympathy and condolence to the bereaved family. It recognizes that his life having been devoted to his profession, his death is a severe loss to the profession, and particularly to this and other societies of which he was a member;

"*Resolved*, That copies of this resolution be forwarded to the family of our lamented friend and *confrère*."

[Signed by L. C. Bryan, Wm. Patten, G. W. Field.]

# PERISCOPE.

Nitrate of Silver in Dentistry.—The convenient use of Argent. Nit. was made possible when Dr. Kirk suggested in the Cosmos the saturation of asbestos fiber with an aqueous solution of the salt. Three years ago I acted on this suggestion, which has made nitrate of silver extremely satisfactory and successful in my practice.

The preparation is made by taking of

Argent. nit., 40 grs.;
Aq. dest., 1 dr.

Reduce the silver to powder, and triturate with water in a Wedgwood mortar. Now take asbestos fiber, bit by bit, in a pair of tweezers, and pass through the flame of an alcohol lamp, to burn out any organic matter that may be present. Place each bit of asbestos in the solution, and repeat it till sufficient has been added, so that the whole is nicely moist without leaving any excess of solution. Transfer to a wide-mouth bottle, preferably with a glass stopper.

For the penetrating power of nitrate of silver I refer the reader to an article which recently appeared in the COSMOS, "The Relative Penetrating Power of Coagulants," where it will be seen that argent. nit. stands high in the list.

Its extraordinary penetrating power must be kept in mind; though experience has taught me that it must be kept in close contact with the pulp to destroy it, and in the cases in which I have used it I have had no reason to think that any harm has followed its application.

If we are to save the teeth of children, this preparation must play a part. It is easily applied to incipient decay by being carried there on an excavator, and it may be applied to deeper cavities where, if it cause pain, the application of fine creasote is the immediate remedy. It is not here urged as a substitute for filling temporary teeth; but in conjunction with other remedies, local and systemic, it will work its wonders, as is generally known. The effects of the first application will be a blackening of the part to which it is applied; but a second and a third application at subsequent visits will be all that is necessary to arrest decay, and all that can be done for the salvation of the temporary teeth from nitrate of silver as a remedy.

Another important use is its power of closing up the gaping ends of the dental fibrillæ at the gum-line, where the cementum has been worn off, leaving them exposed. These sensitive parts should be dried and the fiber applied, and left in contact for a few minutes. The stinging pain caused soon subsides, and the part may be burnished with a steel burnisher rotated in the engine.

The preparation is again useful as a diagnostic agent in molars. It is of great importance to know just exactly whether the pulp is far off, or nearly encroached upon. With a little practice this can be ascertained to a nicety. The cavity nearly prepared for the filling, apply the fiber. While it is there the filling-material may be got ready. If there is not any sensation of pain produced, that cavity will take a metal filling without a non-conductor. If, however, the cavity is a very deep one, no pain from the application will indicate a dead pulp.

If, after an interval of a minute or two, the patient, previously warned, reports slight pain, the operator is assured that the pulp is not far off, and will be best conserved by lining the cavity. If, however, pain is felt immediately the fiber is placed in the cavity, its immediate removal is demanded, and creasote or oil of cloves substituted to relieve the pain. In this case capping or destruction of the pulp is indicated. Argent. nit. used in this way saves an enormous amount of the operator's time in that an exact condition of the tooth is readily known.

In dead teeth the fiber has been employed most satisfactorily after the repeated application of the essential oils with aristol. It is easily carried to the end of the canal, and its penetrating power, I think, accounts for its value. Having used it frequently in this capacity, it has never given rise to pericemental irritation. Applied carefully to the root-ends of even incisors, and followed up with a gutta-percha cone, no discoloration of the tooth-neck has ever occurred.

In mouths where the exciting cause of caries is present, and fresh "chalky" cavities are constantly forming, the nitrate of silver will give surprising results. The fiber may be left in shallow cavities while others are being excavated. When removed, the inside of the cavity will present a yellow color, gradually changing to black, and a distinct hardening of the dentin. So treated, the dreaded recurrence of decay in these teeth does not take place.

It is supposed that oxid of silver is deposited wherever the salt penetrates and blackens.—*W. Theo. Shanasy, in Australian Journal of Dentistry.*

# HINTS, QUERIES, AND COMMENTS.

To Fold Gold Foil without Contact of the Fingers.—It is certainly known by every careful operator that many unsuccessful fillings are caused by contact of the fingers in preparing the foil for introduction. The writer has successfully pursued a simple mode of procedure in handling gold foil without contact with the fingers which may be new to many, and which is as follows: The book of foil is held in the left hand and opened to the first leaf, the right half of the book is slightly raised so that the outer edge of the sheet of foil nearest the right hand will fall, with the help of a little shaking, inward so that the two edges will be approximated at the central fold of the book, which is then closed on the folded gold and pressed into contact with the fingers passed over the outside covers of the book. The same process is repeated until the leaf of foil is folded to the desired number of thicknesses. The strip of folded foil can then be cut into strips the desired width with shears.

To prepare gold and tin for cohesive working take a whole or half sheet of gold foil and anneal on mica, do the same with a half or quarter leaf of tin and anneal carefully in proportion to the degree of heat the tin will bear without melting, then fold the tin strip inside the leaf of gold foil so that the gold completely envelops the tin to an equal thickness on both sides.—Dr. A. G. Weber, Havana, Cuba.

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# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

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The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

**Barrett** (W. C.) Oral pathology and practice. A text-book for the use of students in dental colleges and a handbook for dental practitioners. Phila., 1898, S. S. White Dental Manf. Co., 251 p. 8°.

**Baudet** (Raoul.) Du mal perforant buccal. Par., 1898, G. Steinheil, 83 p. 8°.

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**Abel** (R.) Zur Bakteriologie der Stomatitis und Angina ulcerosa. Centralbl. f. Bakteriol. [etc.], 1. abt., Jena, 1898, xxiv, 1–7.—**Albertin.** Cancer récidivé de la lèvre inférieure avec propagation au maxillaire ; résection en bloc de la tumeur (parties molles et les ⅔ de la portion horizontale du maxillaire); prothèses immédiats et successives ; autoplasties ; restauration de la région ; rétablissement de la fonction; guérison sans recidive controlée 4 ans après l'intervention. Bull. Soc. de chir. de Lyon, 1897–8, 53–57.—**Andrew** (G.) Dentigerous cysts. Glasgow M. J., 1898, l, 127–131.—**Arkövy** (J.) Adatok a caries profunda kór-és mütéttanahoz. [Contributions to the pathology and surgery of caries profunda.] Orvosi hetil., Budapest, 1898, xlii, 344. ——— Periodontitis unilateralis atque pulpitis acuta totalis consecutiva. *Ibid:* 345. ——— Abcessus alveolaris circumscriptus acutus traumaticus. *Ibid:* 346. ——— Untersuchungen uber die Pathologie und Therapie des Abscesses alveolaris chronicus. Oesterr.-ungar. Vrtljschr. f. Zahnk., Wien, 1898, xiv, 195 ; 291.—**Arrington** (B. F.) Preservation of natural teeth on a conservative basis of treatment. Am. Dent. Weekly, Atlanta, 1898, i, 569–573.—**Ault** (M. F.) Preliminary and graduation requirements; the logical standard. Dental Digest, Chicago, 1898, iv, 524–527.—**Baldwin** (A. E.) Some facial deformities and prevention; abstract. Dental Reg., Cincin., 1898, lii, 386–390.—**Bardach** (H.) Ein Beitrag zur Lehre von der Wurzelfüllung. Oesterr.-ungar. Vrtljschr. f. Zahnk., Wien, 1898, xiv, 331–338.—**Baumgarten** (S.) Exstirpation der linken Hälfte der Zunge nach einer neuen Modification von der Regio submaxillaris ans, mit vorheriger Unterbindung der Arteria lingualis et maxillaris externa. Aerztl. Centr.-Anz., Wien, 1898, x, 338.—**Beaudouin** (G.) Glossite exfoliatrice. Bull. Soc. franç de dermat. et syph., Par., 1898, ix, 262.—**Bedell** (O. W.) The young man in dentistry. Dental Digest, Chicago, 1898, iv, 527–529.—**Berger** (F.) Eszmecsere az empyema antri Highmori felett. [Change of ideas as to empyema of the antrum of Highmore.] Orvosi hetil., Budapest, 1898, xlii, 369. ——— Az empyema Antri Highmori. Magyar. fogász.szemle. A. Stomatol. [etc.], Budapest, 1896–7, i, 377–396; 1897–8, ii, 7–15.—**Berger** (P.) Ulcerations tuberculeuses de la langue. Méd. mod., Par., 1898, ix, 465.—**Beurnier** (L.) Subluxation spontanée du maxillaire inférieur chez les jeunes sujets. Rev. gén. de clin. et de thérap., Par., 1898, xii, 417–419.—**Billeter** (C.) Uber Kombination von Amalgam und Zement. Schweiz. Vrtljschr. f. Zahnk., Basel, 1898, viii, 200–203.—**Bockhorn** (M.) Ein Fall von Tuberculose der Parotis. [Beitrag zur chirurgischen Pathologie der Parotis.] Arb. a. d. chir. Klin. d. k. Univ. Berl., 1898, xiii, 62–74.—**Bönnecken**. Offene Antwort an Herrn. Dr. Schreier, prakt. Zahnarzt in Wien. Oesterr.-ungar. Vrtljschr. f. Zahnk., Wien, 1898, xiv, 338. ——— Sur de nouveaux procédés de traitement des pulpes malades. Progrès dent., Par., 1898, xxv, 193–200.—**Bonnard** (E.) Anesthésie locale en art dentaire. Odontologie, Par., 1898, 2. s., vii, 58–61.—**Bouche** (C.) Cancer du maxillaire supérieur; résection du maxillaire supérieur; guérison. J. d. sc. méd. de Lille, 1898, ii, 137.—**Boulay** (M.) Sinusites maxillaires diverticulaires et cloisonnées. Arch. internat. de laryngol. [etc.], Par., 1898, xi, 375–383.—**Briggs** (F.) De la cataphorèse; sa valeur en chirurgie dentaire. Rev. odont., Par., 1898, xvii, 307–310.—**Brophy** (T. W.) Conservatism in oral surgery. Dental Rev., Chicago, 1898, xii, 589–593.—**Bryan** (L. C.) American dentistry abroad. Internat. Dent. J., Phila., 1898, xix, 509–514.—**Byram** (J. Q.) Dental technic. Indiana Dent. J., Indianap., 1898, i, 738–744.—**Case** (C. S.) New methods and appliances in orthodontia. Dental Rev., Chicago, 1898, xii, 573–589.—**Chupein** (T. S.) Des substances d'empreintes et de leurs modes d'emploi. Progrès dent., Par., 1898, xxv, 233–235.—**Collinet**. Epithélioma primitif de l'amygdale. Bull. de laryngol., otol. et rhinol., Par., 1898, i, 95–97.—**Cook** (G. W.) The effect of heat on dentine. Ohio Dent. J., Toledo, 1898, xviii, 371–373.—**Dalma** (D.) Beitrag zur Therapie der acuten Erkrankungen des Periodontiums. Oesterr.-ungar. Vrtljschr. f. Zahnk., Wien, 1898, xiv, 249–251.—**Darin**. De la cataphorèse pour insensibilirer la dentine. Rev. odont., Par., 1898, xvii, 295–303.—**Dewey** (S. B.) Degeneration and decay of the oral tissues from lack of exercise. Ohio Dent. J., Toledo, 1898, xviii, 366–371.—**v. Dobrzyniecki** (A. R.) Beiträge zur Bacteriologie der Zahncaries. Oesterr.-ungar. Vrtljschr. f. Zahnk., Wien, 1898, xiv, 311–317.—**Dolamore** (W. H.) Sulla torsione immediata dei denti, con relazione sopra alcuni casi. Gior. di corrisp. p. dentisti, Milano, 1898, xxvii, 223–230.—**Dolbeare** (F. L.) Cocaine, its action and therapeutics. Items Interest, N. Y., 1898, xx, 588–592.—**Ebergardt** (A. K.) K kazuïstikie linguæ dissecatæ. Voyenno-med. J., St. Petersb., 1898, cxcii, med.-spec. pt., 115–125.—**Evans** (T. C.) Deflections of nasal septum as a factor in dental deformities. Items Interest, N. Y., 1898, xx, 583–588.—**Feindel** (E.) **et L. Feindel**. Les solutions anesthésiques de Schleich en chirurgie dentaire. Odontologie, Par., 1898, 2. s., vii, 61–64.—**Felt** (C. L.) Scar tissue in the pharynx following scarlatina and complicating adenoid vegetations. Laryngoscope, St. Louis, 1898, v, 91.—**Flagg** (J. F.) A review of the past as associated with the work of Prof. Greene V. Black. Pacific Med.-Dent. Gaz., San Fran., 1898, vi, 305–311.—**Fletcher** (F. F.) The ideal bridge of to-day and the next step to improve it; second paper. Dental Digest, Chicago, 1898, iv, 455–459.—**Freeman** (J. A.) Distacco del tartaro dentale. Gior. di corrisp. p. dentisti, Milano, 1898, xxvii, 219–223.—**Frenkel**. Influence de la rougeole sur la réviviscence et l'aggravation des infections bucco-pharyngées. Courrier méd., Par., 1898, xlviii, 236.—**Galdieri** (A.) Alcune considerazioni sulla scialorrea degli alienati. Incurabili, Napoli, 1898, xiii, 321–341.—**Gaston**. Papillome muqueux bènin la lèvre inférieure. Ann. de dermat. et syph., Par., 1898, 3. s., ix, 659.—**Gaston et Haury**. Papillome muqueux bénin de la lèvre inferieure (lymphangiectasie circonscrite œdemateuse). Bull. Soc. franç de dermat. et svph., Par., 1898, ix, 266.—**Gerlich** (V.) Ueber Odol und dessen Antisepticum. J. f. Zahnheilk., Berl., 1898, xiii, no. 26.—**Ghedini** (A.) La cheiloplastica del Durante nella resezione totale del labbro inferiore. Raccoglitore med., Forli, 1898, 6, s., ii, 69–74.—**Glogau** (E. A.) Uber Zahnregulirung. Schweiz. Vrtljschr. f. Zahnk., Basel, 1898, viii, 194–199.—**Grant** (W. E.) Welding properties of gold and its manipulation. Items Interest, N. Y., 1898, xx, 599.—**Hall** (A. J.) Case of membranous inflammation of tongue and mouth, with presence of the staphylococcus pyogenes aureus and other micrococci. Brit. M. J., Lond., 1898, ii, 153.—

**Hallock** (F. K.) Angioneurotic edema of the tongue. Proc. Connect. M. Soc., Bridgeport, 1898, cvi, 153–159.—**Hallopeau** (H.) **et Schroeder.** Sur un lichen plan limité à la muqueuse buccale. J. d. mal. cutan. et syph., Par., 1897, ix, 153–155.—**Harmonic** (P.) De la leucoplasie buccale dans ses rapports avec la syphilis. Rev. clin. d'androl. et de gynéc., Par., 1898, iv, 193–207.—**Harper** (J. G.) Tobacco and its effect on the contents of the oral cavity. Dental Digest, Chicago, 1898, iv, 447–453.—**Harres** (W.) Einige Fälle von uberzähligen Zähnen. Oesterr.-ungar. Vrtljschr. f. Zahnk., Wien, 1898, xiv, 251–254.—**Hattyasy** (L.) Pulpa mumificatióról. [Mummification of the pulp.] Magyar. fogász. szembe. A stomatol. [etc.], Budapest, 1897–8, ii, 145–164.—**Headridge** (J. P.) Theories. Brit. J. Dent. Sc., Lond., 1898, xli, 625–633.—**Heller** (A.) Gomphosis traumatica dentium. Oesterr.-ungar. Vrtljschr. f. Zahnk., Wien, 1898, xiv, 317–321.—**Henke** (R.) Uvula-Anomalien. Monatschr. f. Ohrenh., Berl., 1898, xxxii, 318–326.—**Hinrichsen** (C.) Mr. Dalt's geschliffene Mineral-Einlagen. Cor.-Bl. f. Zahnärzte, Berl., 1898, xxvii, 224–226.—**van der Horst** (C. E.) Chronische pharyngitis, in verband met de diagnose syphilis. Med. Weekbl., Amst., 1898–9, v, 257.—**Hovey** (A. J.) Prosthetic dentistry. Indiana Dent. J., Indianap., 1898, i, 729–732.—**Hubbard** (D. L.) Contributory causes of antrum disease. Items Interest, N. Y., 1898, xx, 577–582.—**Hunt** (A. O.) The relation of the teeth to the lips and face. Dental Brief, Phila., 1898–9, iii, 4–8.—**Hurt** (J. W.) An extraordinary surgical experience [lip bitten off; sewed back; perfect union]. Med. Age, Detroit, 1898, xvi, 420.—**Inglis.** Ueber Arsenik-Nekrose. Zahntech. Reform, Berl., 1898, xviii, 134–140.—**Jack** (L. F.) Restoration with porcelain in fracture of the teeth. Internat. Dent. J., Phila., 1898, xix, 493–496.—**Jacobs.** Réflexes stomacaux dus à une métrite chronique sclereuse. Bull. Soc. belge de gynéc. et d'obst., Brux., 1898–9, ix, 67.—**Jameson** (A.) Suggestion as a factor in controlling patients during dental operations. Ohio Dent. J., Toledo, 1898, xviii, 373–377.—**Jeanbrau** (E.) Un cas de grenouillette sublinguale; examen histologique de la poche; pathogénie. N. Montpel. méd., 1898, vii, 676–682.—**Jeffery** (L.) Un caso di prognatismo degli incisivi superiori e loro raddrizzamento coll'apparecchio di Angle. Gior. di corrisp. p. dentisti, Milano, 1898, xxvii, 211–213, 2 pl.—**Jonas** (A. F.) Removal of the epitheliomatous tonsil, by the external route (pharyngotomy), with a report of two successful cases. J. Am. M. Ass., Chicago, 1898, xxxi, 337–339.—**Jones** (H. I.) Catarrh of the antrum of Highmore. Pacific Med.-Dent. Gaz., San Fran., 1898, vi, 311–314.—**Kantorowicz.** Behandlung der Tonsillenhypertrophie mit innerer Massage. Deutsche Med.-Ztg., Berl., 1898, xix, 632.—**Katz** (A. I.) Phlegmone glossolpiglotticum. Voyenno-med. J., St. Petersb., 1898, cxcii, med.-spec. pt., 8–16.—**Kerr** (O. L.) Preparation of compound cavities in molars and bicuspids. Dental Digest, Chicago, 1898, iv, 521–524.—**Kettig** (E. M.) More about the maxillary bones. Items Interest, N. Y., 1898, xx, 596–599.—**Kimm** (J. A.) Anesthesia. Indiana Dent. J., Indianap., 1898, i, 733–738.—**Kirchner** (G.) Leucoplakia oris. Deutsche Zahnärztl. Wchnschr., 1898, i, 179–182.—**Kirk** (E. C.) Eine seltene Zahn-Anomalie. Cor.-Bl. f. Zahnärzte, Berl., 1898, xxvii, 220–224.—**Kreisler** (J.) Allgemeines über Zahnextraction. Oesterr.-ungar. Vrtljschr. f. Zahnk., Wien, 1898, xiv, 226–249.—**Kuttner** (H.) Ueber die Lymphgefasse und Lymphdrusen der Zunge mit Beziehung auf die Verbreitung des Zungencarcinoms. Beitr. z. Klin. Chir., Tübing., 1898, xxi, 732–786, 4 pl.—**Lacoarret.** De la leucoplasie buccolinguale; coexistence d'un psoriasis lingual et cutané. Rev. hebd. de laryngol. [etc.], Par., 1898, xviii, 817–826.—**Lavisé.** Resection ostéoplastique du maxillaire supérieur par le procédé de Kocher. Ann. Soc. belge de chir., Brux., 1898–9, vi, 226–230.—**Lindsley** (De C.) Antidotes. Dental Digest, Chicago, 1898, iv, 533–536.—**Lowry** (H. S.) Ueber eine neue Methode der Zahnfüllung. Cor.-Bl. f. Zahnarzte, Berl., 1898, xxvii, 243–246.—**Luckie** (S. B.) Physical conditions that determine choice of filling-materials. Internat. Dent. J., Phila., 1898, xix, 503–509.—**McCardie** (W. J.) On a modification of Mr. Coxon's method of prolonging nitrous oxide anæsthesia during dental operations, namely by means of a mouth tube and closure of the nares. Lancet, Lond., 1898, ii, 319.—**McKinney** (R.) Tertiary syphilitic ulceration of uvula simulating primary lesion. Memphis M. Month., 1898, xviii, 360.—**Miller** (A. G.) Sull'eziologia e cura delle enfiagioni delle glandule cervicali. Gior. di corrisp. p. dentisti, Milano, 1898, xxvii, 213–218.—**Molin.** Névralgie du trijumeau traitée chirurgicalement. Lyon méd., 1898, lxxxviii, 374.—**Montigel** (F.) Eine seltene Dentitions-Anomalie. Schweiz. Vrtljschr. f. Zahnk., Basel, 1898, viii, 180–188.—**Morestin** (H.) Tumeur congénitale de la lèvre inférieure; angiolymphangiome. Bull. Soc. anat. de Par., 1898, lxxiii, 430.—**Munger** (C. E.) Diseases of the tonsils. Proc. Connect. M. Soc., Bridgeport, 1898, cvi, 160–172.—**Musson** (Emma E.) Empyema of the antrum. Internat. Dent. J., Phila., 1898, xix, 496–503.—**Noyes** (F. B.) Report of clinic No. 37; amalgam experiments. Dental Rev., Chicago, 1898, xii, 609–614.—**Papot** (E.) Inauguration du nouveau local de l'école dentaire de Paris. 1e visite de l'école dentaire "la maison commune des dentistes." Odontologie, Par., 1898, 2. s., vii, 5–8, 1 pl. – **Patterson** (J. D.) The ideal lower denture in difficult cases. Dental Digest, Chicago, 1898, iv, 441–444.—**Payne** (R. E.) The singing voice and speaking voice as influenced by irregularity of the teeth. Items Interest, N. Y., 1898, xx, 563–571.—

**Pearson** (W. B.) Tinfoil matrices. Dominion Dent. J., Toronto, 1898, x, 223–225.—**Peck** (A. H.) The essential oils and some other agents; their antiseptic value; also, their irritating or non-irritating properties; abstracts. Dental Reg., Cincin., 1898, lii, 351–368. ——— *Also:* Dental Rev., Chicago, 1898, xii, 593–608.—**Port**. Ueber die Behandlung der Zahnkrankheiten durch den praktischen Arzt. J. f. Zahnheilk., Berl., 1898, xiii, no. 24.—**Pynchon** (E.) The submerged tonsil. Chicago M. Recorder, 1898, xv, 86–96.—**Raoult** (A.) **et Finck**. Note sur un cas de malformation congénitale du voile du palais. Arch. internat. de laryngol. [etc.], Par., 1898, xi, 395–397.—**Raoult** (A.) **et G. Thiry**. Des amygdalites ulcéro-membraneuses chancriformes avec spirilles et bacilles fusiformes de Vincent. Rev. hebd. de laryngol. [etc.], Par., 1898, xviii, 881–905.—**Ready** (R. L.) Pyorrhea alveolaris and its treatment. Dental Digest, Chicago, 1898, iv, 453–455.—**Respinger** (H. B.) Ein Beitrag zum Kapitel der supernumerären Zähne. Schweiz. Vrtljschr. f. Zahnk., Basel, 1898, viii, 204–215.—**Roberts** (W. L.) A new combination for filling root canals and method of manipulation. Items Interest, N. Y., 1898, xx, 604–607.—**Robertson** (D. B.) Dental caries. Dental Reg., Cincin., 1898, lii, 368–386.—**Rumbold** (F. M.) Mastoiditis of dental origin, occurring in a diabetic, with an unusual formation of the mastoid cells; operation; recovery. Laryngoscope, St. Louis, 1898, v, 109–115.—**Sachse** (B.) Meine Erfahrungen mit Formagen. Deutsche Monatschr. f. Zahnh., 1898, xvi, 335–339.—**Scheele**. Bromäther-Narkosen une meine Erfahrungen über dieselben. Deutsche Zahnärztl. Wchnschr., 1898, i, 135–139.—**Schmidt** (C.) Ueber Noma. Jahrb. f. Kinderh., Leipz., 1898, xlviii, 72–85, 1 pl.—**Schreiber** (M.) Storia della terapia operativa del trisma. Gior. di corrisp. p. dentisti, Milano, 1898, xxvii, 198–211.—**Schreier** (P.) Ueber Local-Anästhesie mittelst Cocaininjectionen und Schleich'scher bei Zahnextractionen. Oesterr.-ungar. Vrtljschr. f. Zahnk., Wien, 1898, xiv, 322–330.—**Shepherd** (B. F.) The dentist. Indiana Dent. J., Indianap., 1898, i, 744–749.—**Smallwood** (G. V.) Alveolar abscess. Brit. J. Dent. Sc., Lond., 1898, xli, 633–643.—**Smith** (H. A.) Concerning the possibilities in the art of filling teeth. Ohio Dent. J., Toledo, 1898, xviii, 363–366.—**Templeton** (J. G.) Practical things in dental practice. Dental Brief, Phila., 1898–9, iii, 1–4. ——— To duplicate models and impressions. *Ibid:* 8–11.—**Thompson** (A. H.) Antiseptics in dentistry. Dental Digest, Chicago, 1898, iv, 529–533.—**Towner** (M. S.) Donations to the army and navy museum. Items Interest, N. Y., 1898, xx, 574–576.—**Turner** (W. A.) The innervation of muscles of the soft palate. Laryngoscope, St. Louis, 1898, v, 33–36.—**Vallas**. Pharyngotomie trans-hyoïdien. Bull. Soc. de chir. de Lyon, 1897–8, 49–51.—**Van Tossen** (C. L.) Christian science in dentistry. Items Interest, N. Y., 1898, xx, 572–574.—**Voituriez**. Lymphangiome superficiel, à forme papillaire de la langue. J. d. sc. méd. de Lille, 1898, ii, 49–55.—**Walkhoff** (O.) Ein Fall von Kieferresection und ihre Behandlung. Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 332–335. ——— Fotografia delle ossa facciali coi raggi Röntgen. Gior. di Corrisp. p. dentisti, Milano, 1898, xxvii, 186–188, 2 pl.—**Walsham** (H.) On the occurrence of cartilaginous and bony nodules in the tonsil. Lancet, Lond., 1898, ii, 394.—**Wasson** (L. C.) The treatment of proximate cavities in the incisors. West. Dent. J., Kansas City, 1898, xii, 289–306.—**Weiser** (R.) Die radicale Behandlung der Zahnwurzel-Cyste und des Alveolar-Abscesses. J. f. Zahnheilk., Berl., 1898, xiii, no. 25.—**Wellauer** (J.) Uber Neubildungen. Schweiz. Vrtljschr. f. Zahnk., Basel, 1898, viii, 188–194, 1 pl.—**Whoerlin** (A.) Ueber Verletzungen und traumatische Aneurysmen der Arteria maxillaris interna. Beitr. z. klin. Chir., Tübing., 1898, xxi, 663–690.—**Winckler** (E.) Zur operativen Behandlung des hyperplastischen Zungentonsille. Wien. med. Wchnschr., 1898, xlviii, 1497–1500.—**Witzel** (A.) Regulirung vorstehender oberer Zähne durch eine schiefe Ebene, befestigt an den unteren Zähnen. Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 340.—**Witzel** (J.) Ueber die Wirkung der arsenigen Säure und des Thymols. Cor.-Bl. f. Zahnärzte, Berl., 1898, xxvii, 193–220.—**Wolfenden** (A. B.) Cataphoresis. Brit. J. Dent. Sc., Lond., 1898, xli, 673–676.—**Yearsley** (M.) Papilloma of the tonsil. Laryngoscope, St. Louis, 1898, v, 79–85.—**Zimmerman** (C.) Hemorrhage following tonsillotomy. Arch. Otol., N. Y., 1898, xxvii, 334–340.—**Znamensky** (N. N.) Ueber die Entstehung der keilformigen Defecte (Erosion) der Zähne. Cor.-Bl. f. Zahnärzte, Berl., 1898, xxvii, 227–237. ——— Sull'origine delle erosioni dei denti. Gior. di corrisp. p. dentisti, Milano, 1898, xxvii, 188–197.

# LIST OF UNITED STATES PATENTS

## PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING AUGUST, 1898.

*August 9.*—No. 608,984, to WINFIELD E. HANSON. Dental plugger.

THE

DENTAL COSMOS.

VOL. XL. PHILADELPHIA, NOVEMBER, 1898. No. 11.

# ORIGINAL COMMUNICATIONS.

## STUDIES OF THE MAXILLARY BONES.

No. 2.

BY M. H. CRYER, M.D., D.D.S., PHILADELPHIA, PA.

(Read before the Dental Society of the State of New York, May 11 and 12, 1898.)

MR. PRESIDENT AND MEMBERS OF THE DENTAL SOCIETY OF THE STATE OF NEW YORK:

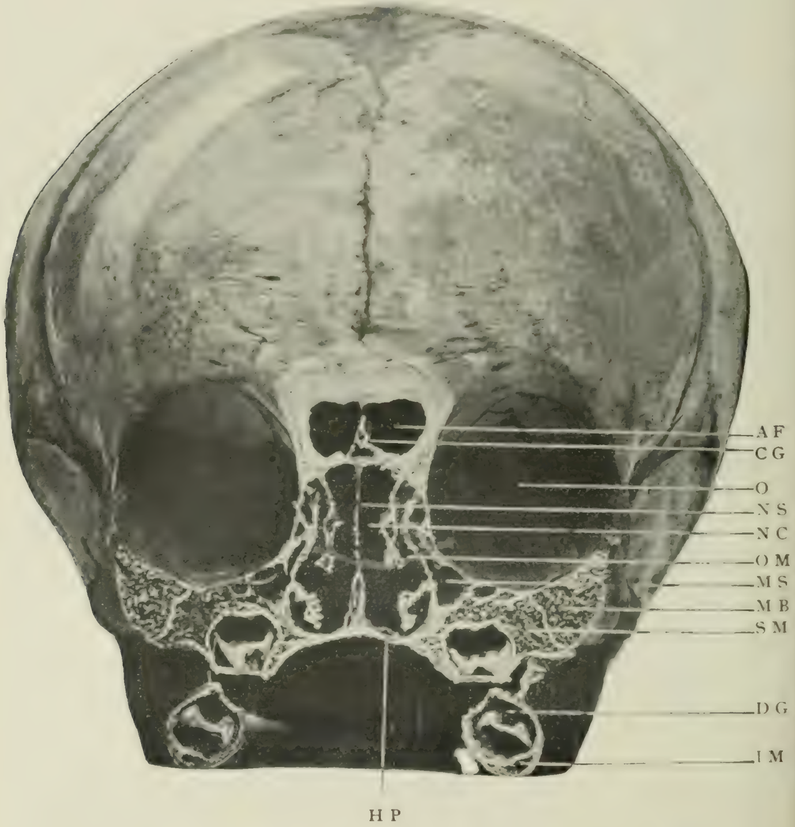
It gives me great pleasure to have the opportunity of addressing you upon the "Studies of the Maxillary Bones."

No man who spends any considerable portion of his time in the study of practical anatomy—that is, actual dissections—can fail to note how great is the number of anatomical variations he meets with. So common are these variations that it cannot be exactly said which is typical normal anatomy, and which are the anatomical variations. In plain words, anatomy is not a study to be classed among the exact sciences. I do not mean by this that there is not such a regular basis of anatomical science that safe anatomical rules cannot be made, but the more closely we study the subject the more variations as to details we are compelled to record. To be sure, given the mandible of an animal, a femur, or even a tarsal bone, the nature of associated bones, their size, positions, and forms can be deduced, and by further study even an entire animal can be reconstructed. Admitting this, however, there are still as many variations in the internal anatomy as there are differences in the external appearance. Especially is this true in the anatomy of the human head. This special regional anatomy is modified by age, disease, occupation, climate, race, and many other conditions.

By age. The skull consists of bones of both cartilaginous and membranous origin. In the fetus and infant the bones are soft and yielding; they receive deposits of calcific material until the bones become harder and harder as age advances. In the upper and lower jaws there are constant changes caused by development, eruption, and the loss of the teeth and the alveolar process.

Disease causes anatomical changes in the bony structures as well as in the other tissues of the body. In some disorders of the nutritive system the bones may not become incorporated with the full amount of calcific material, which would have the effect of leaving them soft and yielding; or on the other hand an undue quantity of calcium salts may be incorporated into the bones, with the opposite effect of making them hard and unyielding, thus modifying the physiological functions that should take place in and about them.

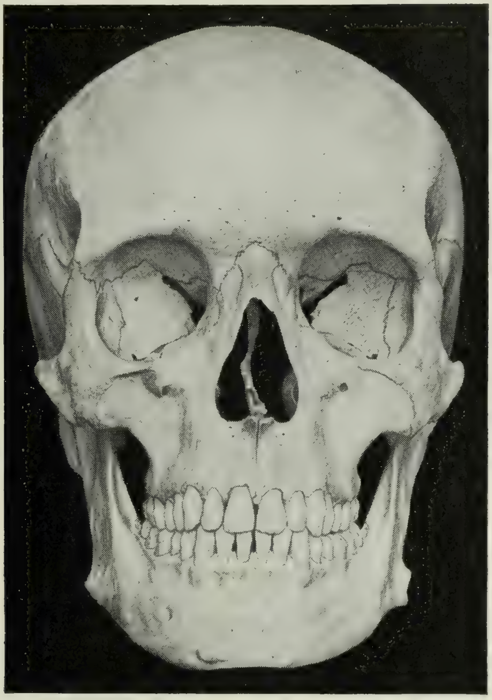
Fig. 1.



Occupation will modify the general shape and character of the face and head, especially in youth. Those who are studious and pass an indoor life will have more delicate development of the face, with a larger brain-case, than those who are brought up with a laborious outdoor life. The mastication of coarser foods will develop the muscles of mastication and their bony attachments. Numerous other factors might be cited to show the influence of personal habit upon the course of anatomical development.

Climate and its consequent environment has a great influence in modifying the development of the bones of the head, as is demonstrated in the different formations of the skulls of the great races of the world.

FIG. 2.



There are also great variations in the shape, size, and markings of one side of the face from the other in the same individual. In the bilateral bones, such as the frontal, sphenoid, vomer, and lower jaw, one side is generally found to differ from the other. This being the case, it will be readily understood that the internal openings and spaces, such as the mouth, the nasal chambers, and the orbits, the maxillary, frontal, and sphenoidal sinuses, the ethmoid and other cells, will differ accordingly.

The density of the bones varies also in different persons and at different periods of life in the individuals.

The pictures I will show you to-night are made from my own dissections. I wish to apologize for showing a few slides that have already been published; they are used on this occasion to

Fig. 3.

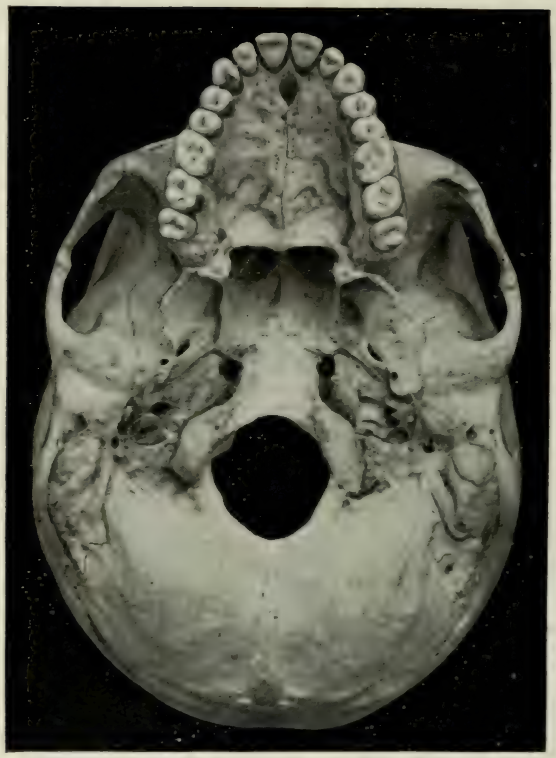


Fig. 4.

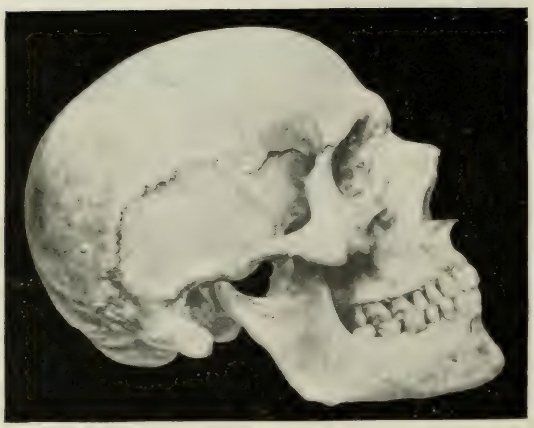


Fig. 5.

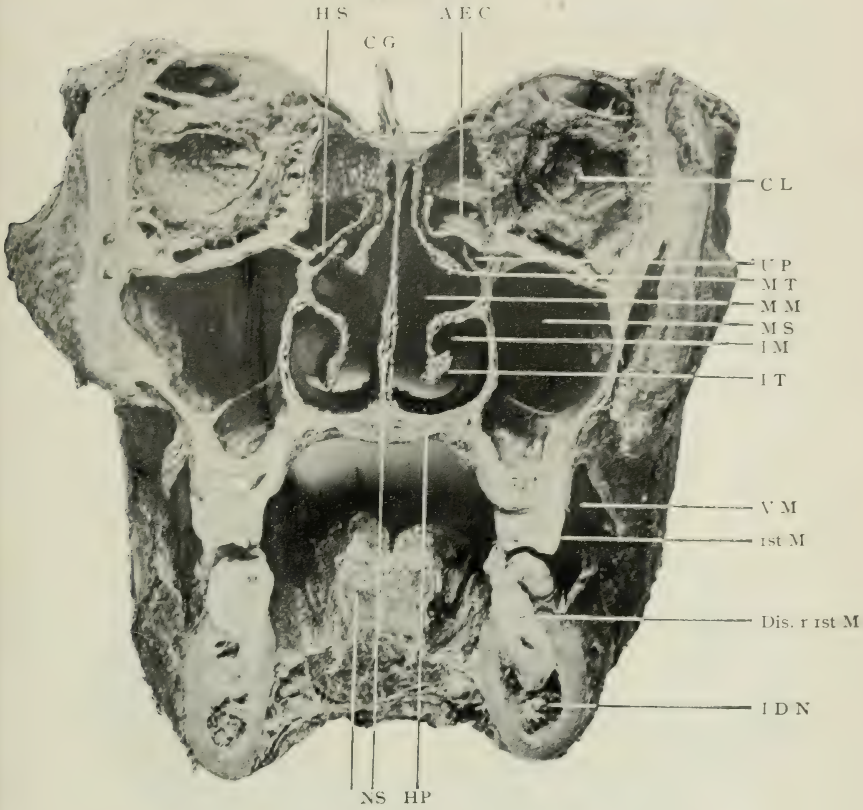

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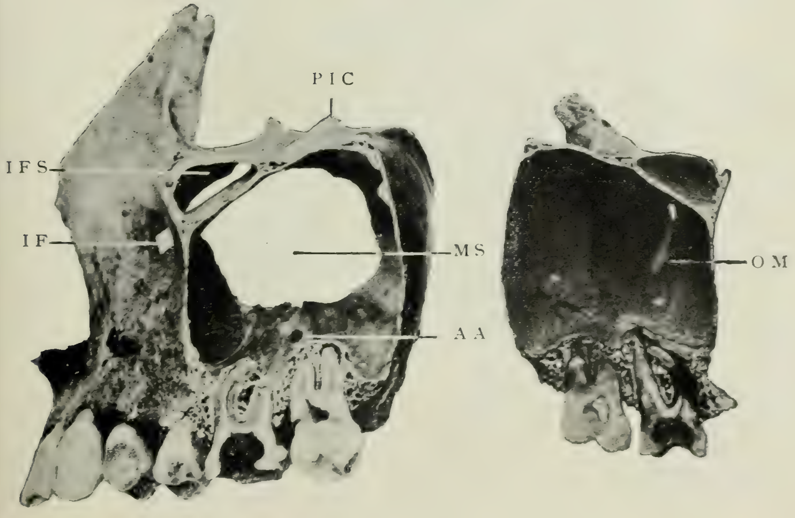
Fig. 6.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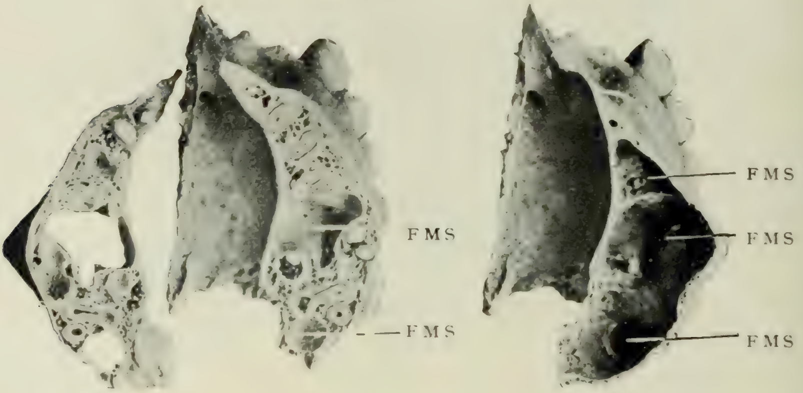
demonstrate new points, or to establish more fully points that I spoke of in 1895.*

In order to thoroughly appreciate the delicate symmetry and shades of differences which occur in the construction of the anatomy of the face, it is necessary to study those skulls and bones that are considered typical at various periods of life.

Slide No. 1 is made from the skull of a seven-months' fetus. It is a transverse perpendicular section, passing just within the floor of the orbit. In the upper portion of this section will be seen two openings into the brain-case, with the crista galli and falx between them; below this is the nasal chamber with its septum; projecting from the upper walls of the chamber are the middle turbinals. In the middle meatus there is seen the unciform process forming the inner wall of the hiatus semilunaris, passing upward and a little forward from the base of the inferior turbinal to the outer side of this process of the hiatus semilunaris, from which there is a small opening communicating with the maxillary sinus, which is very small at this period of life. The greater portion of the maxillary bones, both superior and inferior, is occupied by the developing tooth-organs. The section will show how nearly symmetrical the skull is in this region at this time of life.

FIG. 7.



Slide No. 2 is a typical skull of an adult person. It is nearly symmetrical, and presents an almost ideal anatomy of the external bony structure of the face. There is but the slightest variation of the two sides. It may be noticed that the upper right first molar stands out slightly more than the left. The septum of the nose is seen to be deflected in the same direction, and on examination of the internal structures of the nose it is found that the bulla-ethmoidalis is enlarged on the left side, projecting toward the concavity of the septum. It may be taken as quite a constant anatomical law that when the mouth, palate, and dental arches are bilaterally symmetrical, the outer cranial structures exhibit a like condition; even more, this bilateral symmetry will be found to extend throughout the body. However, this law, as all others relating to anatomical science, is open to exceptions.

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*See DENTAL COSMOS for January, 1896, in which will be found a glossary of the abbreviations used in connection with the illustrations.

FIG. 8.

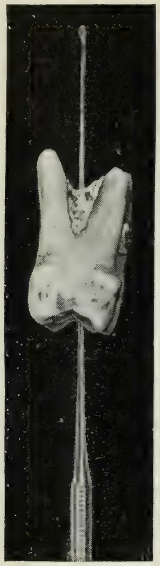
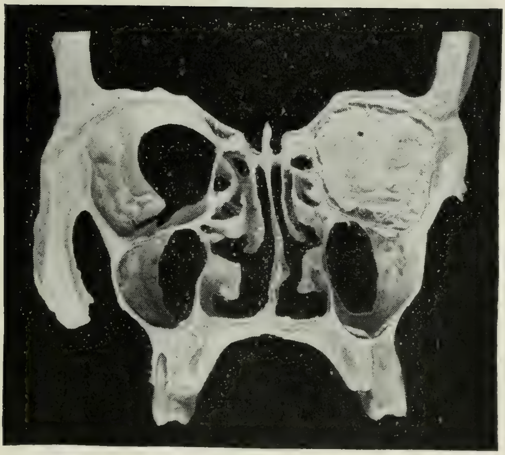


FIG. 9.



Slide No. 3 shows an under view of the same skull, almost anatomically perfect. It will be noticed that the upper right first molar stands out slightly more than the left, and that the external plates of the pterygoid process are not quite alike upon both sides; there is also a slight difference in the zygomatic arches of the two sides. The skull is tilted slightly, so that the sides do not appear as symmetrical as they really are.

Slide No. 4 gives the side view of this almost typical skull, with its perfect occlusion of the teeth.

Slide No. 5 shows a perpendicular transverse bilateral section passing through the anterior portion of the orbit, maxillary sinus, and the first molar of each jaw on both sides. The eye has been divided in front of the crystalline lens. Between the upper portion of the nasal cavities are seen portions of the middle ethmoidal cells. It will be noticed how nearly symmetrical the parts are. The maxillary sinuses are not quite alike, as the saw passed a little farther back on the right side than it did on the left, cutting more toward the center of the malar bone on the right side than on the left. The floor of the antrum descends between the roots of the molars,—a condition much more common among the white race

FIG. 10.

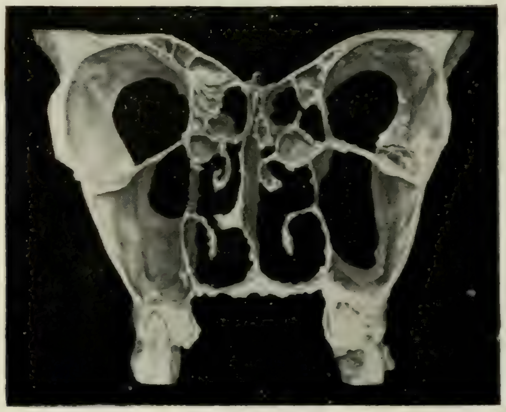
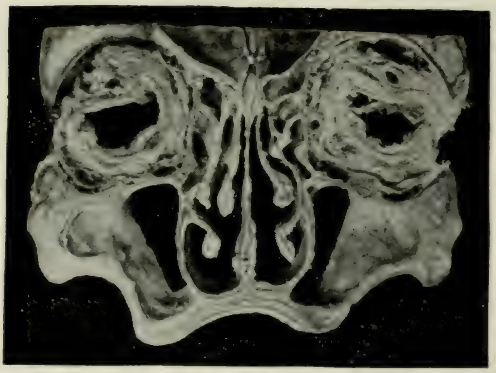


FIG. 11.



than among the negroes, according to my observation. Abscesses upon the roots of such teeth may and sometimes do cause perforation of the floor of the antrum, and the extraction of a tooth may be accompanied by the fracture of the floor of the sinus, a portion of it coming away with the tooth.

FIG. 12.

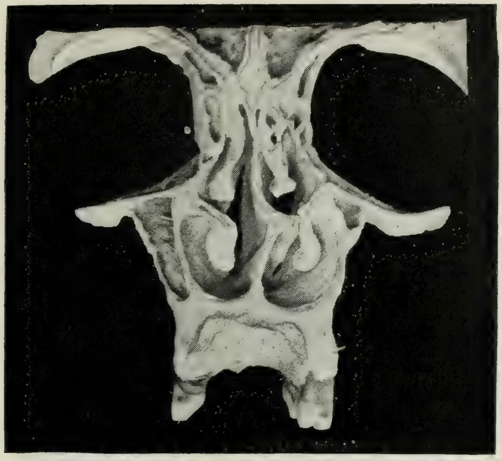
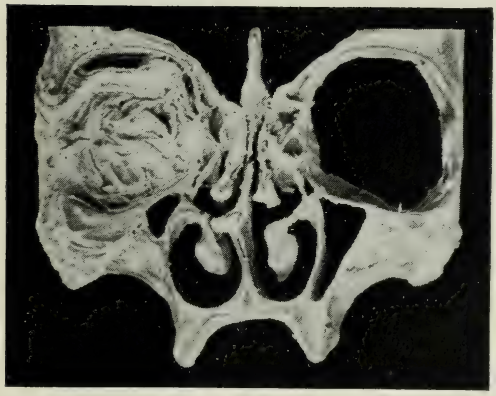


FIG. 13.



If we admit that pus or infected matter will pass in the direction of the least resistance, we might suppose that by the close approximation of the apical foramen of the roots of the molars, when an abscess is formed at their points the infected matter would pass into the antrum instead of through the alveolar process into the mouth. My clinical experience teaches me otherwise,—*i.e.*, an abscess caused from an infected tooth usually makes its fistula into the mouth. The only reason I can give for this is that nature usually protects weak and important points in various ways. In this case I believe the muco-periosteum lining of the sinus takes up its defence, and through its osteoblastic layer builds and protects its walls against absorption and perforation.

Slide No. 6 is a section of the upper right maxilla. In consequence of the death and decomposition of the pulp of the first molar, there has been, first, irritation and a constructive periostitis upon the floor of the antrum, which has caused a thickening of the bone over the apex of the root. At a later period suppurative inflammation has occurred; an abscess has formed and perforated the floor of the antrum.

FIG. 14.

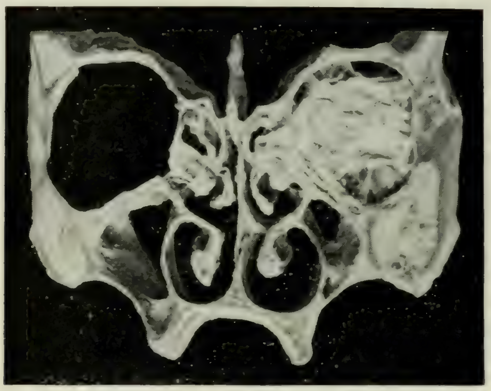
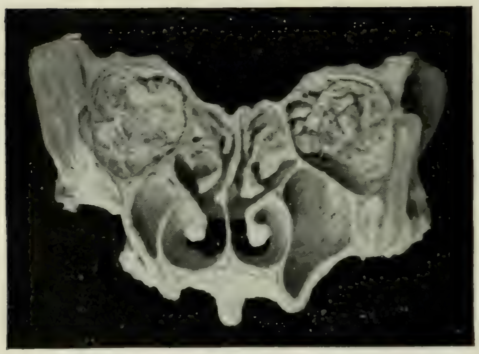


FIG. 15.

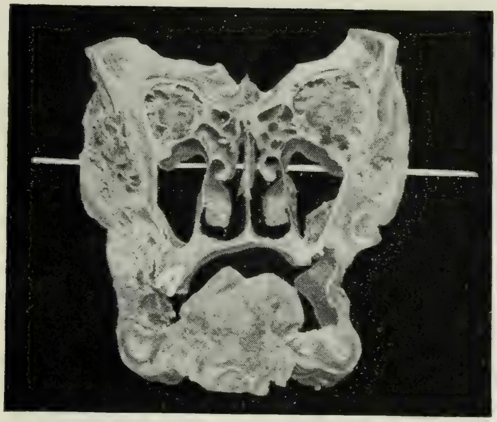


Slide No. 7 is made from the left maxilla of the same skull. In this section the pulp of the first molar was also devitalized. In the right picture it will be noticed there is quite an exostosis over the position of the infected root, and by examination of the palatal surface of the root it is found that the discharge of the abscess was made into the mouth, and I believe that it is the usual outlet for apical abscesses,—of course recognizing that they occasionally open into the antrum. I believe that the diseased antrum more frequently comes from malformation and diseased nasal chambers than from the teeth.

Slide No. 8 is a photograph of a tooth which has been drilled through while in the mouth, the operator supposing his drill was passing up the palatal root of the tooth, instead of which it passed through the pulp-chamber, the base of the crown, the alveolar process, and into the maxillary sinus. It will be observed that in extracting it a portion of the floor of the antrum has been brought away with the tooth. At the time of extracting the patient was suffering from empyema of the antrum.

Slide No. 9 is the transverse vertical section of a negro. Note the great thickness of the floor of the antrum. The roots of the teeth of the negro seldom pass up into the outer or inner walls.

FIG. 16.



The floor of the maxillary sinus is somewhat triangular in its general outline. It is concave from side to side, and slightly so in the antero-posterior direction, thus giving a basin-like form to the floor of the cavity, which is usually below the level of the floor of the nasal chambers, and uneven owing to the presence of partial septa and the elevations over the roots of the various teeth. Usually the roots of the various molars, and sometimes the roots of the premolars, and even cuspids, will be found in this position. The floor of the maxillary sinus of the negro is usually smooth. Septa may extend upward to various heights transversely from side to side, making deep pockets; they are usually composed in large part of membranous structure, and sometimes extend upward nearly to the roof of the sinus. A knowledge of this fact is important in evacuating the cavity when opening for abscesses in this region, which would not permit a free evacuation of pus from the entire cavity.

Note also the differences between the unciform process and the bulla-ethmoidalis of one side as compared to those of the other.

Slide No. 10 is introduced to show the vertical septa, springing from its floor, and dividing the lower portion of the cavity into semi-chambers. Septa of two sizes are shown in the left side. Note also how the resorption of the walls of the antrum has reduced the thickness to thin boundary layers. Note the projection of the bulla-ethmoidalis upon one side; it is common to find a deviation of the nasal septum from that side in such cases, as may be seen in some of the following figures.

Slide No. 11 exhibits a condition occasionally met with, the floor of the antrum dipping downward, and partly under the floor of the nose; resorption has taken place between the plates forming the floor of the nose and the roof of the mouth. It will be noted, from the axis of the alveolar process, that in this case the sinus could be drained directly from the palatal aspect of the mouth. In some skulls the floor may be situated far below the level of the nose. In such cases the vault of the mouth is high, while in others the floor may be higher in the nasal chamber. The two floors of the maxillary sinus in the same individual may vary in shape, size, and in the level of the floors and their roofs.

FIG. 17.

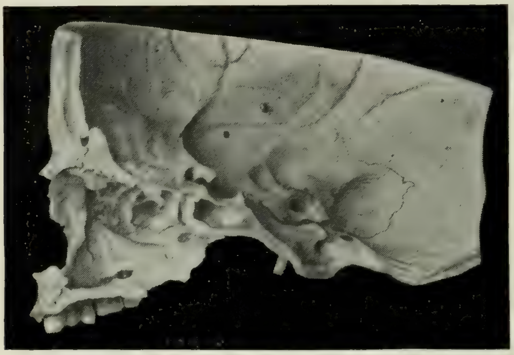
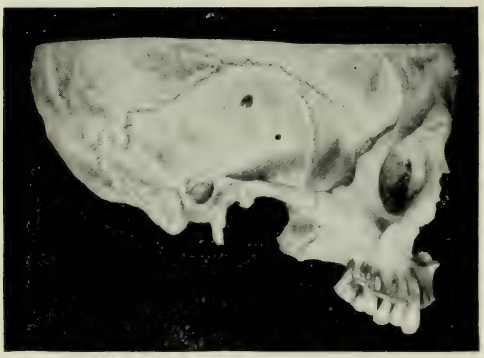


FIG. 18.



Slide No. 12 exhibits an entire lack of symmetry between the nasal fossæ and sinus of the right and left sides, the inferior meatus of one side being closed anteriorly by the deflected nasal septum and "spur."

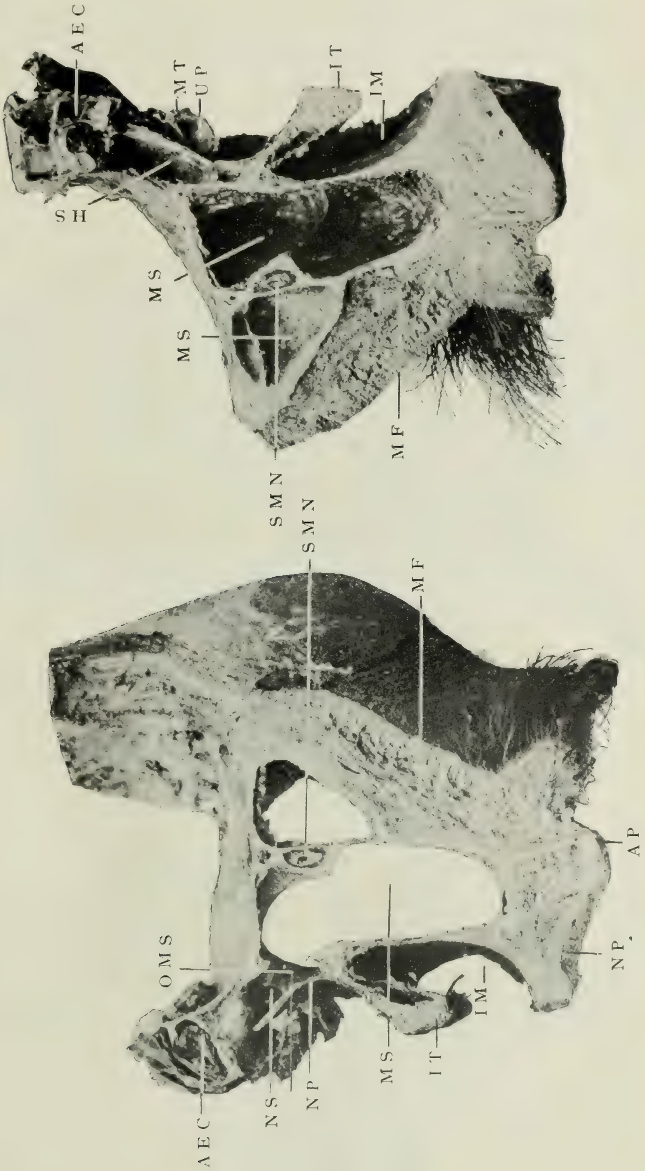
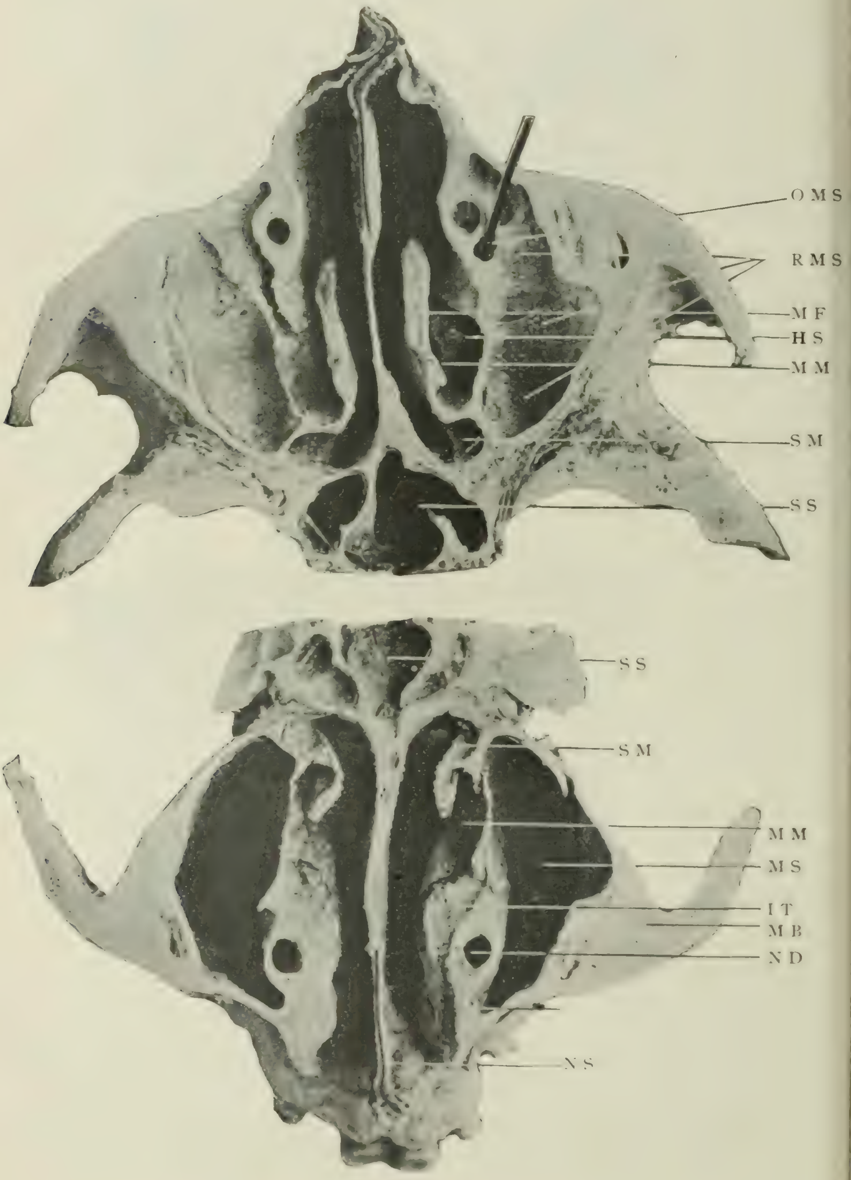


Fig. 19.

Slides Nos. 13, 14, and 15 are from the same head. It will be noted that a line, or instrument, passing through the axis of the alveolar process of the right side of Fig. 15 and the left side of

Figs. 13 and 14 would perforate the floor of the nostril, instead of the floor of the antrum. The roof of the sinus varies similarly to the other surfaces of this cavity. It is usually triangular in shape, the base of the triangle being at the inner wall of the nasal chamber. It is convex in a transverse direction, its inner edge varying

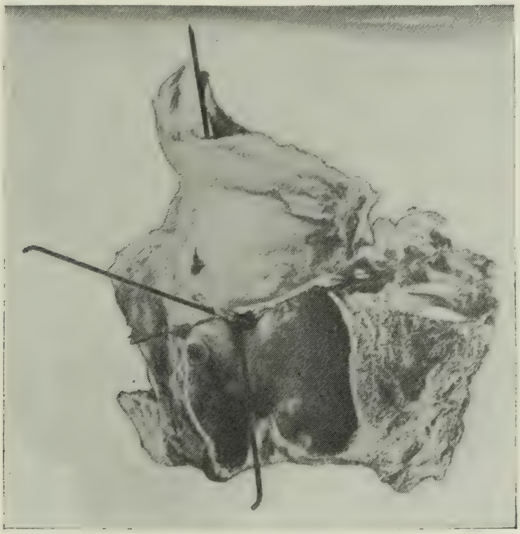
Fig. 20.



in the height of its junction with the inner wall. Sometimes the junction is found only slightly above the level of the floor of the orbit (see Fig. 19); at other times the junction is formed much higher, near the level of the center of the inner wall (see Figs. 15 and 16).

Slide No. 16 is a posterior view of a perpendicular transverse section of the face. It gives a good view of a transverse section of the posterior ethmoidal cells. The white line is on the level of the floor of the orbit in the anterior portion of the section. It will be noticed, as is often the case, that the root of the maxillary sinus runs up as it passes backward until it is far above the level of the floor of the orbit at its anterior margin.

FIG. 21.



Slide No. 17 is from a skull where the floor of the nasal chamber extends outward over the alveolar process until it reaches the outer wall of the maxillary bone. The points of the palatal roots of the molars will be noticed in the floor of the nasal chamber. The floor of the sinus is well up on the side of the bone.

Slide No. 18 is a picture from the facial surface of Fig. 17. It is shown principally to indicate the resorption of the alveolar process from over the roots of the teeth, leaving a portion of the bone along the free margin of the process.

Slide No. 19. It will be noticed in this picture that the roof of the sinus is almost level, and that the inner portion is attached to the inner wall nearly on a level. The left figure of the slide shows the division of the maxillary sinus into two, the outer one I have called the infraorbital sinus. At the upper corner of the object or picture is the normal opening of the maxillary sinus, leading into the hiatus semilunaris, which is bounded below to the inner side by the unciform process, to the outer side by the wall of the sinus, and above by the wall of the bulla-ethmoidalis. The last-named rounded projection contains the middle ethmoidal cells; they vary in size in different skulls, and often in the same skull. I believe this structure to be an important factor in causing various diseases of this region, including those of the maxillary and frontal sinuses.

FIG. 22.

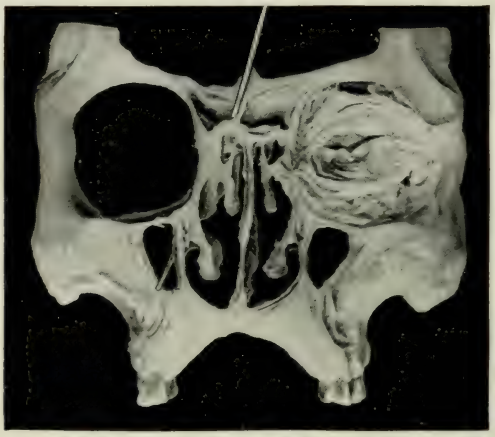
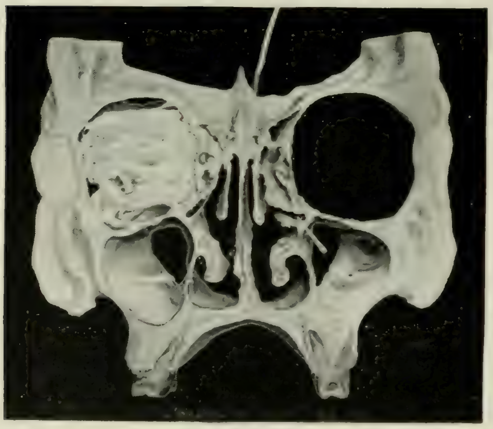


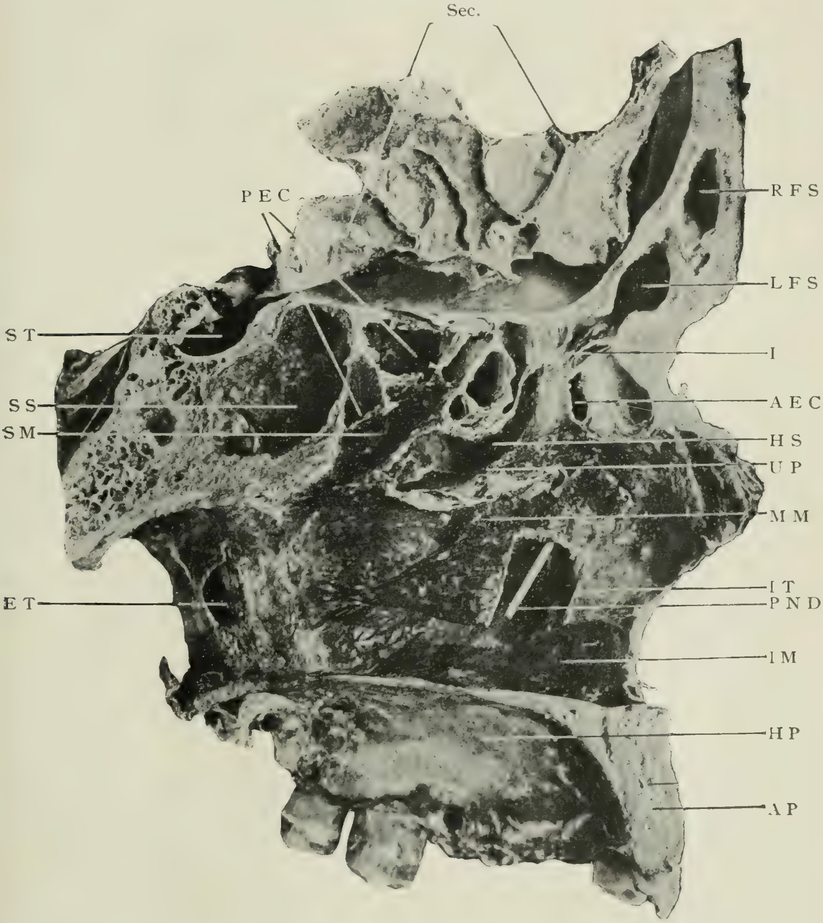
FIG. 23.



Slide No. 20 shows the upper and lower views of a transverse section passing near the roof of the antra, where it is noted that the place of exit from the antra is in the roof.

Slide No. 21 is one that I exhibited at the American Dental Association of 1895. With it and others I demonstrated clearly, distinctly, and beyond a doubt the close relation between the frontal and maxillary sinuses, and also that fluids could and did pass from the frontal sinus and ethmoid cells into the maxillary sinus. The two probes passing through the osteum maxillare pass into the nasal chamber, the one passing backward going directly through the posterior part of the hiatus semilunaris into the middle meatus, while the perpendicular probe passes into the hiatus semilunaris, then upward and a little forward into the frontal sinus.

FIG. 24.



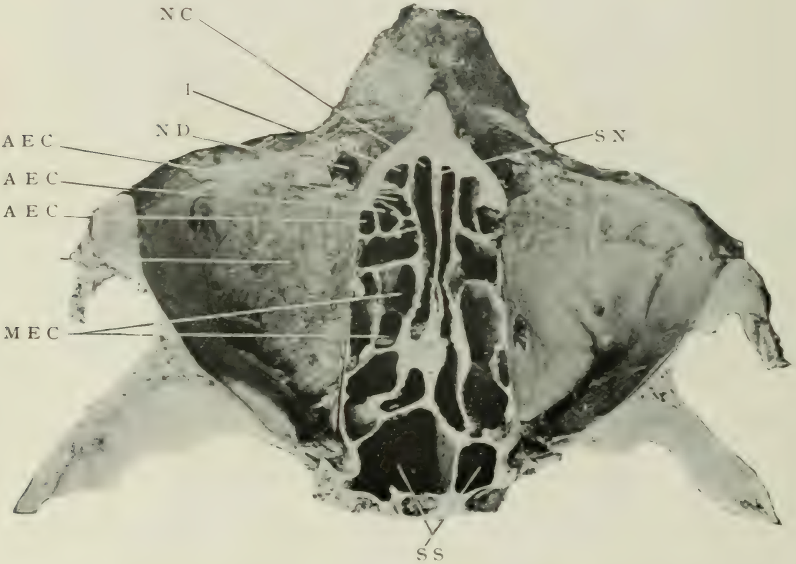
Slide No. 22 is an anterior view of a transverse perpendicular section, showing the lower portion of the frontal sinuses on both sides with a probe passing from the right, downward and slightly outward along the hiatus semilunaris, and then through the osteum maxillare into the maxillary sinus. It will be noticed there is quite a difference in the anatomy of the anterior ethmoid cells bilaterally.

Slide No. 23 is a posterior view of the same section of the skull just passed. As the probe passes downward and outward it can be seen passing along the hiatus semilunaris, through the osteum maxillare and into the sinus without obstruction in its path. Here notice the lack of bilateral symmetry in the uncinate process and the bulla-ethmoidalis. As this is a section of a negro skull, note the great thickness of the floor of the antrum.

Slide No. 24, before published, shows the outer nasal wall with the middle turbinal cut loose and turned up. It gives a good idea of the normal anatomy of this region. The frontal sinuses are shown, the upper one being the right sinus where it passes over the median line to the left side.

The lower portion of the frontal sinus is funnel-shaped; this portion of the sinus and the passage leading into the middle meatus is usually called the infundibulum, though this name is not now recognized by some of the leading specialists of these parts. The greater portion of the passage is the anterior upper part of the hiatus semilunaris of Zuckerkandl. This hiatus is a semicircular groove, or cleft, and is the continuation of the passage from the frontal sinus. It extends downward and backward in a curved direction, becoming horizontal in its posterior portion, terminating a little posterior to the center of the cavity. At its commencement it is narrow, but it widens out as it passes downward and backward, its widest portion being the bottom, where the opening, "osteum maxillare," is found. Besides the opening of the frontal and maxillary sinuses into the passages, there are those from the anterior and middle ethmoidal cells. The outer boundary is composed of the walls of the ethmoidal cells and the partition between it and the maxillary sinus.

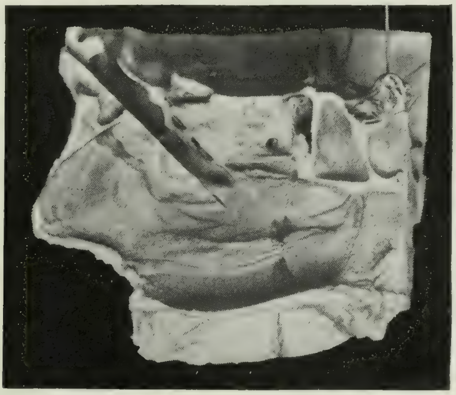
FIG. 25.



Its inner wall is the unciform process, and it forms a shield or guard to the opening of the maxillary sinus, thus preventing foreign substances from passing into the maxillary. A "sound" cannot be passed through the opening into the sinus in a living normal subject.

Slide No. 25 is from a transverse section through both orbits and the upper portion of the nasal chamber, giving a good view of the cross-section of the anterior, middle, and posterior ethmoidal cells, and also the sphenoidal sinus. This picture also illustrates the ethmoidal cells, situated principally between the two orbits in a horizontal section. Many of them are formed by the union of the orbital plates of the frontal bone and the ethmoid bone; others are associated alone with the ethmoid. The anterior ethmoid cell is the smallest of the three divisions, and opens by several small orifices into the anterior portion of the hiatus. The middle ethmoidal cells vary more in size than the other two. The inner covering, or wall, is sphenoidal in form, and is known as the bulla-ethmoidalis (see Fig. 24). It is situated in the upper portion of the lateral wall of the hiatus semilunaris, and extends upward and inward toward the unciform process. The openings of the cells are in the walls of the bulla-ethmoidalis, and discharge into the hiatus semilunaris.

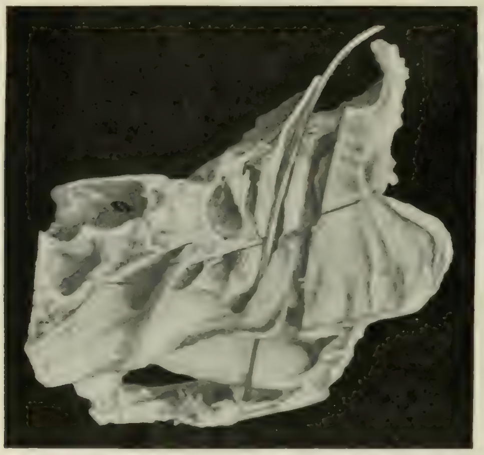
FIG. 26.



It is through the increase in the size of the bulla-ethmoidalis that such disturbance is caused in the anterior and superior portion of the nasal chamber, the frontal sinuses, and antrum of Highmore; by its enlargement it presses toward and against the septum, closing the space. When the enlargement is downward it presses more upon the unciform process and into the hiatus semilunaris, closing this semi-circular groove and preventing the passage of the fluids from the frontal sinuses and the anterior portion of the middle meatus; consequently they enter the maxillary sinus, and through general inflammation of the parts there is an excess of fluids that cannot find exit. This would interfere with the vitality of the teeth through pressure on the nerves and vessels passing through the sinus. It is from these nerves and vessels that branches pass into the apical foramen of the roots of the various teeth, though this is doubted by some of our investigators. The excess of fluids without an exit will cause fullness of all the anterior cells as well as the frontal sinus, and even cause fullness of all the anterior portion of the brain-case. It is this blocking of the hiatus semilunaris which causes the secondary or associated openings between the antrum and the nasal chambers.

Slide No. 26 gives another view of the hiatus semilunaris leading downward and backward from the frontal sinus into the middle meatus, a portion of the wall covering the middle ethmoidal cells (the bulla-ethmoidalis) having been cut away.

FIG. 27.



Slide No. 27 shows two hiatuses, or what some would term infundibuli, leading directly downward into the maxillary sinus. The posterior one has a probe passing in it, while the anterior one has had its outer wall cut away in order that a better view could be obtained.

Slide No. 28 gives two pictures of the nasal chamber; in the left picture the nasal septum is in position. It will be seen that there is an opening in it, exposing to view the bulla-ethmoidalis and its ethmoid cells. This absorption of the portion of the septum has been caused by pressure of a deflected septum and the enlargement of the bulla-ethmoidalis.

The right picture shows the two abnormal openings between the nasal chamber and the maxillary sinus where the septum has been removed, and also the loss of the greater portion of the middle turbinal by absorption through the pressure of the bulla down near the unciform process. In consequence of enlargement or distension of the chambers of the bulla-ethmoidalis, there has been occlusion of the hiatus semilunaris; presumably the contents of the antrum have made for themselves an escape by forcing false foramina.

FIG. 28.

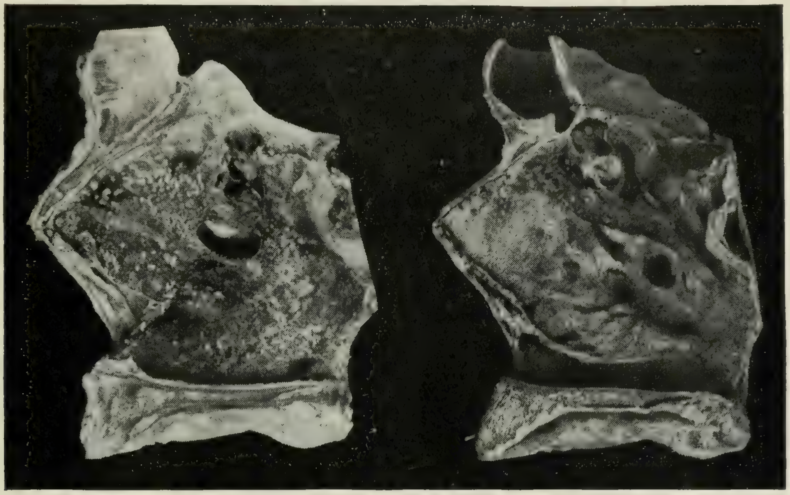
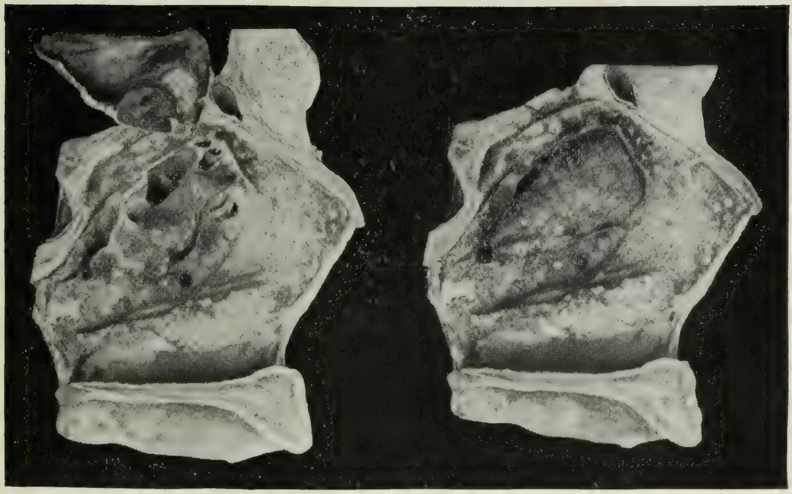


FIG. 29.



Slide No. 29 is two pictures from the left side of the same skull; the right picture has the middle turbinal in position, showing an abnormal opening. The left picture has the middle turbinal cut loose and turned upward, exposing the bulla-ethmoidalis extending downward and closing the hiatus, this closure compelling the fluids to pass into the maxillary sinus, which in turn causes the abnormal opening from the maxillary sinus in the nasal chamber posteriorly to the original normal opening.

Slide No. 30. The right picture shows the outer wall of the antrum removed, the section passing almost through the axis of the molars. The relation of the ends of the roots of these teeth with the floor of the antrum is shown. The special feature of this cut is the double opening from the antrum.

FIG. 30.

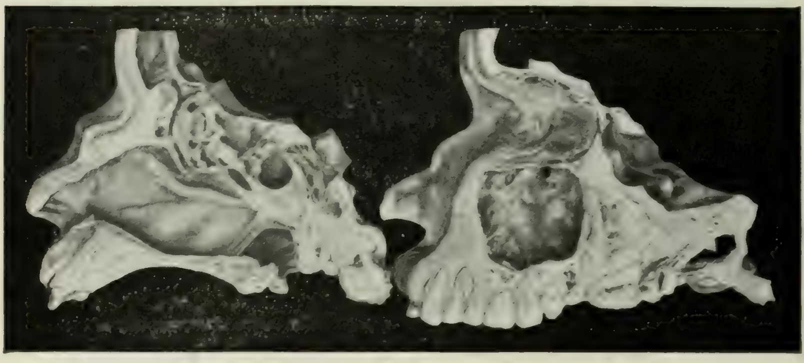
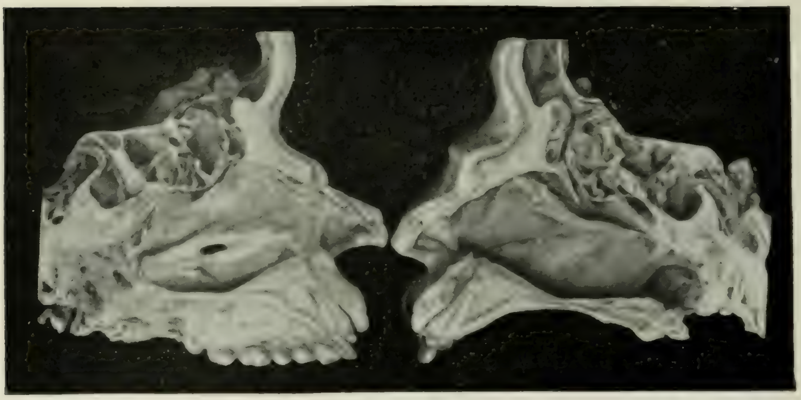


FIG. 31.



The left picture is made from a section cut immediately within the nasal cavity of the same subject. It shows a section of the bulla-ethmoidalis, which is very large, extending downward and forward, partially closing the infundibulum or the hiatus semilunaris.

Slide No. 31 is from the same specimen, the left picture being the same as that of the right in the last, the right being the outer half of the section. They show a bulla-ethmoidalis cut through. There is also a condition sometimes met with, particularly when the hard palate is usually flat: the floor of the nose, instead of being horizontal, is depressed about the middle, giving a concavity to the floor of the nose, as shown in this slide.

FIG. 32.

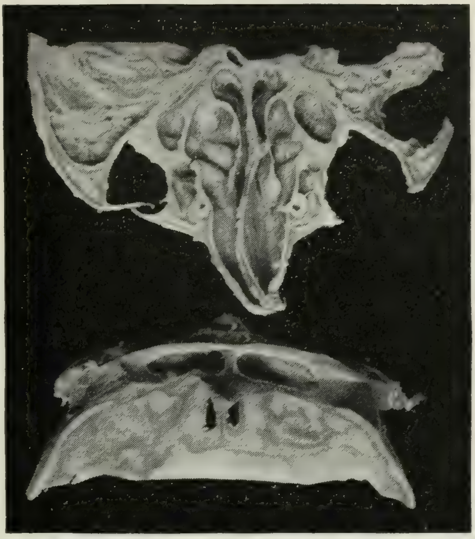
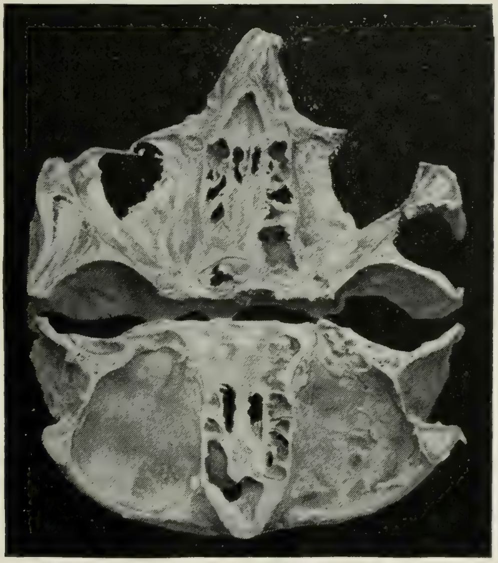


FIG. 33.



Slide No. 32. The lower picture shows a transverse section through the anterior fossa of the brain-case, and through the frontal sinuses, from one of which there has been no foramen of exit. The upper picture gives a view of the roof of the maxillary sinus and the roof of the nasal chamber.

Slide No. 33. Same subject; the section made one inch below the lower section of Fig. 32. It shows the downward excavation which has occurred in the occluded sinus. In the lower surface of the specimen is shown the excavation extending in the direction of the nasal spine. A marked irregularity of the ethmoidal cells of the two sides will also be observed.

Slide No. 34 is also a specimen of unilateral occlusion. This section exhibits the floor of the brain-case. It appears as though the secretion of the occluded sinus has formed a retention cyst, the pressure of which has caused perforation of the brain-case, the crista galli being bent down almost flat by the growth of the cyst. Unfortunately, I have no ante-mortem or clear post-mortem notes of the cases; I should expect, however, that the patient presented cerebral symptoms.

Fig. 34.

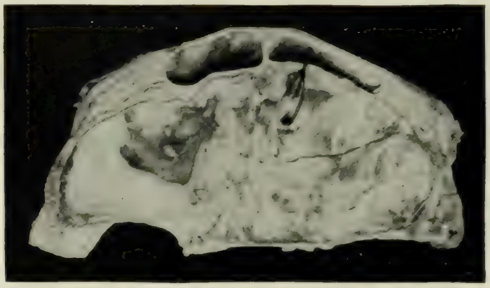
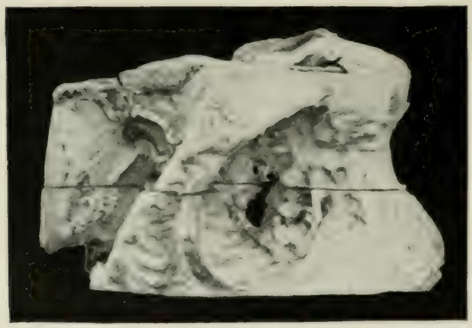


Fig. 35.



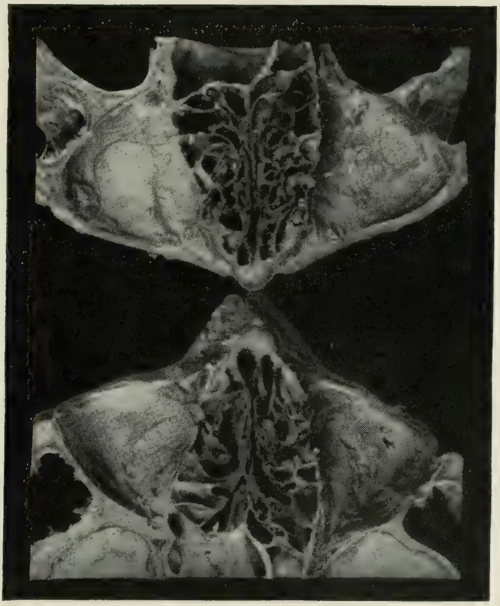
Slide No. 35. Same specimen; shows the effects of the encroachment of the cyst upon the inner orbital wall, which is badly broken down. The horizontal line through the picture indicates a section which the next picture will show.

Slide No. 36 shows a horizontal section through the ethmoidal cells and nasal fossæ, etc., at a point indicated in Fig. 35.

It may be well to speak of a general principle which may be applied in the treatment of the closure of the nasal passages.

It is a fundamental law of surgery, wherever there is an obstruction to any of the passages within the body to remove it, and if possible to re-establish the course of the fluids into their normal channels or conduits. If the hiatus semilunaris, commencing as it does at the lower portion of the frontal sinus and extending downward and backward from the frontal sinus, the anterior and middle ethmoidal cells, as well as from the maxillary sinus, if I say this hiatus becomes closed in any portion, or at the inlets, by bony or other growths, it is good and proper surgery to remove the obstructions. If the fluids from the various sinuses and cells are allowed to accumulate in the maxillary sinus without an outlet the teeth and the alveolar process will become involved, and after failure of local treatment within or through the mouth the patient may be referred to a rhinologist. Many of the rhinologists, however, after being baffled with the nasal and antral troubles, will often make outlets from the antrum into the mouth, thus giving passage to the fluids, diseased or otherwise, that should pass from the superior and anterior portion of the nose and frontal sinus, into the middle meatus. Through their inability to make fluids pass along their normal courses, they sometimes resort to this bad surgery. The mouth must be kept pure and clean from these foul discharges, and it is the duty of those who care for the nose to treat their special region without infecting the oral cavity.

FIG. 36.



By the illustrations shown to-night it has been noted that we have many marked variations in the general character of the bony structures. It is evident that there must be some general principles underlying these changes. It may be well to define certain laws that influence them.

At the commencement of the growth of the embryo and continuing throughout life, there are two forces constantly acting upon the body, known as the intrinsic and extrinsic. If these two forces be normal in strength and application throughout fetal life, the result will be a fully developed child; but if these forces be interfered with in any way by the lack of nourishment or undue external pressure, the child will not be of a normal physique.

If for some reason there is an insufficient quantity of lime-salts assimilated into the bony tissue, the bones will be soft and will not give proper shape to the body, they being the framework, such as the steel frameworks are to our lofty buildings. The brain-case is liable to enlarge when intrinsic growth of the brain forces out the soft yielding structure, while on the other hand an over amount of calcic salts will harden the bone, and cause it to resist the intrinsic forces and prevent them from giving proper shape. At times the deposit of lime-salts will close up the sutures of the brain-case and absolutely prevent the expansion of the brain. Microcephalic skulls are sometimes caused in this way. By the use of the surgical engine, artificial sutures have been made which allow the brain to extend, as these sutures permit the case to expand.

The slopes and forms of the skulls of the various races are influenced by the growth of the brain. In other words, the brain by its intrinsic forces acting upon the bone-tissue will cause the skull to develop, according to the character of the individual or race. If the anterior lobes of the brain are of large size, the forehead will be carried upward and forward; if, on the reverse, the cerebellum is large, the occipital region extends backward with a low and receding forehead.

After the birth of the child muscular action and various forces have direct influence over the change of the shape of the bones, according to the following general laws.

The normal application of forces to developing bone results in the normal development of the form of the bone. The abnormal application of forces under the same circumstances results in the development of an abnormal form. Abnormal applications of forces to bone in adult life will also change and modify the shape and character. The bones becoming changed, the whole body is modified according to the change in the bone-tissue.

It is of course to be understood that the factor behind these anatomical variations, leading to asymmetrical development, is necessarily nutritional. Some local interference with normal nutrition has brought about functional disturbance of a part, and this in turn a corresponding modification of anatomical form.

# A FEW CONSIDERATIONS IN FILLING TEETH.

BY C. N. JOHNSON, L.D.S., D.D.S., CHICAGO, ILL.

(Continued from page 816.)

## APPROXIMAL CAVITIES IN BICUSPIDS AND MOLARS.

THE principles involved in the treatment of caries occurring on the approximal surfaces of bicuspids are so similar to those occurring on like surfaces of molars that they will be considered as one class of cavities. Minor differences in the detail of the work will, it is true, be called for, but these are readily suggested by the differences in the forms of the teeth. The position and function of bicuspids and molars are nearly identical, and they are subject to practically the same influences leading to decay primarily and to a recurrence of decay around fillings. The same forces are at work to dislodge fillings, and the same general plan of anchorage must be pursued in the one as in the other. For these reasons they are treated in common.

## SIMPLE APPROXIMAL CAVITIES NOT INVOLVING OTHER SURFACES.

The instances are very rare where it may be deemed advisable to fill this kind of a cavity. Usually when decay begins on the approximal surface of a bicuspid or molar, the proper preparation of the cavity involves its extension through to the occlusal surface. Almost the only exceptions relate to those cases where the cavity faces an open space caused by the loss of a tooth, or to those occasional instances where there has been extensive recession of the gums in the interproximal space and consequent decay in the cervical region. This latter usually occurs in advanced age, when such extensive cutting as would be necessary to involve the occlusal surface would not be justifiable, and where the open interproximal space admits of access from the buccal aspect. The farther rootwise the decay occurs the stronger the argument for filling without extending occlusally, on account of the better facility for approach and the greater thickness of the occlusal wall.

But in ordinary caries occurring near the contact point, and with the teeth standing in line one against the other, the rule should be to open the cavity to the occlusal surface. The reasons for this lie in the fact that in such cases access cannot be gained to do perfect work short of very extensive separation, and then when the teeth have been so separated and filled, and have fallen back to their original position, an element of danger to the filling remains on account of the margin of the filling being too near the contact point. The reason that decay begins in this locality in the first instance is because a certain area of the tooth-substance is left exposed to the action of micro-organisms, undisturbed by friction of the tongue, cheeks, the tooth-brush, or of food in the process of mastication. If the line between enamel and filling be left near the contact point, the same influences which induced the original decay may be expected to act on the enamel at the margin of the filling to bring about a recurrence. If the cavity is extended occlusally far enough to make a clean margin, the occlusal wall is thereby rendered too weak to withstand mastication. All operations performed upon these surfaces without extension must therefore be considered in the light of temporary work.

Sometimes such fillings do good service through the care with which they are inserted, coupled with the probable fact that just at this time the patient acquires a partial or complete immunity from caries. Many indifferent operations have received credit for being perfect owing to this very fact of immunity, and the whole question of periodical immunity and susceptibility of our patients in regard to the attack or progress of dental caries should receive more careful consideration than it does. But what concerns us now in treating the present subject is that clinical experience proves most of these small fillings to be temporary, and resort should be had to their occasional insertion with this fact clearly in mind.

The plan of anchorage for such fillings is very simple. There is little stress to dislodge the filling, and all that seems necessary in the formation of the cavity is to make parallel walls surrounding it at right angles with the axial wall, and to bevel the enamel margins.

### Proximo-Occlusal Cavities in Bicuspids and Molars.

Wherever decay has so invaded the approximal surface as to involve the occlusal surface, or wherever it is deemed necessary to open the cavity to the occlusal surface in those cases having this wall still remaining, a new class of conditions confronts the operator. In view of the fact, as already intimated, that most approximal cavities in these teeth must be made to include the occlusal surface, it becomes necessary to study somewhat carefully the conditions governing the treatment of such cases.

The principal objects to be attained in the insertion of this kind of a filling are, first, to check the existing decay; second, to prevent, so far as possible, a recurrence of decay in the future; third, to securely anchor the filling against displacement from the stress of mastication; and, fourth, to so restore the original form of the tooth that it will be maintained in its proper relation with the other teeth and with the gum-tissue filling the interproximal space.

The first of these requirements may be met by simply removing the decay and inserting a filling with perfect margins; and this would seem to be the limit of attainment with many operators. A failure to recognize other necessities in the case is accountable for much of the disappointment following these operations, through the temporary nature of this kind of work.

The same general rules of extension for prevention apply to these cavities that were given for approximal cavities in the anterior teeth, except that in bicuspids and molars esthetic considerations do not so materially affect the case, and the rules may therefore be less frequently waived on this account. The usual points of recurrence of decay around these fillings are at the cervico-buccal and cervico-lingual angles of the cavity, though in cavities left very narrow bucco-lingually the entire buccal and lingual margins may become involved.

Another form of failure, where cavities are narrow in the region of the marginal ridge, relates to a fracture of the enamel at the proximo-occlusal angles. Enamel left in this form is easily broken down by the stress of mastication, causing a break between the filling and the margin. Fig. 16 illustrates a bicuspid with a narrow filling *a*, points of recurrence of decay *b b*, and of fractured enamel *c c*. The line *d* indicates extension to avoid these forms of failure.

The plan of anchorage for these fillings calls for careful consideration along the lines of the most approved mechanical principles, and with a due regard for the location of the filling and the probable stress to which it will be subjected in the process of mastication. The force of mastication varies greatly in different individuals, and the intelligent operator will take cognizance of this and govern his operations thereby.

In estimating the probable durability of a filling and the extent of anchorage required to maintain it in place, a careful study should be made of the markings of mastication in the mouth under treatment. The expression "markings of mastication" is coined for the purpose of directing attention to this form of study. Mastication leaves its marks plainly and indelibly upon the teeth and upon fillings placed in them, and these markings offer a good index for the observant operator to estimate the probable average force exerted in ordinary mastication in a given mouth. The use of the gnathodynamometer for the purpose of recording the stress of mastication, while very valuable for scientific study and for throwing much light on the possible force of mastication, is not considered to be the most reliable index to the force actually employed in the comminution of food. The greatest possible force that can be exerted in closing the jaws is often far removed from the actual force used in mastication in the same mouth, and is not invariably relative to it. For this reason, if we accept it as our sole guide for the extent of anchorage required for our fillings, we shall in some instances subject our patients to unnecessarily broad and painful cutting to accomplish an object which might have been attained by less heroic means. On the other hand, we may sometimes fall short of adequate anchorage in those cases where the gnathodynamometer gives a low record, but where the actual wear and tear on fillings in mastication is somewhat severe.

It is true we should aim in all cases to anchor our fillings in such security that the greatest possible stress of which the jaws are capable will not dislodge them, but the conditions under which we are compelled to operate will not invariably permit it. The requisite bulk of tooth-tissue is not always left for us by decay, and the sensibilities of our patient must also be considered. The same statement is true here which was used in connection with cutting cavities in anterior teeth, that we must not jeopardize the nervous system of our patient to follow out some heroic theory. The fact of ignoring the patient in these matters by a blind pursuit of an ideal in the mind of the operator is accountable for much of the aversion experienced against the dental chair, and we must have a care not to discourage people against permitting dental service to be done for them by too great a degree of severity during the operation. This does not imply that we must be slip-shod in our methods, or that we must at all times avoid giving pain. It is occasionally necessary to give pain, but the operator should carefully study his patient and limit the discomfort to a reasonable degree of tolerance. (This matter will be considered more in detail in a subsequent chapter on the treatment of sensitive dentin.)

The markings of mastication relate to worn surfaces of enamel at points of occlusal contact which are evidently formed by mechanical wear instead of by erosion, to deep indentations in fillings made by repeated and vigorous thrusts of the opposing cusp, and occasionally to fractured and jagged enamel showing evidence of rough usage. If the operator will give a careful study to the condition of his patients' teeth and watch for these markings he will soon be able to tell quite accurately the probable degree of service which a given set of teeth are called upon to do at table, and it will often guide him in his methods of anchoring fillings.

FIG. 16.

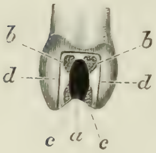


FIG. 17.

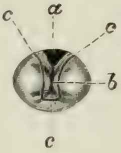
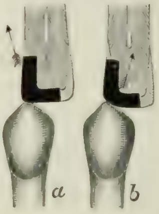


FIG. 18.



The different plans of anchorage for these proximo-occlusal fillings in bicuspids and molars deserve careful consideration. The method almost universally employed in the past has been to cut a groove along the buccal and lingual walls of the cavity, and in some instances to groove the cervical wall. The limitations of this method relate to the insecurity of such anchorage against heavy stress, and to the danger of weakening the walls, particularly in those cases where the buccal and lingual outlines of the cavity are sufficiently extended for safety against recurrence of decay. Unless the grooves are very broad and deep—a condition disastrous to cavity walls—any tipping stress on such a filling will tend to lift it slightly away from the axial wall, leaving a leak along the filling at that point. Then, again, the occlusal aspect of this form of filling is ordinarily unsatisfactory. In bicuspids especially the filling encounters a fissure running mesio-distally between the cusps, and leaving at the junction of the filling and fissure a shoulder on the filling impossible of perfect finish, and an element of weakness in the probable recurrence of decay along the fissure. A fissure is invariably a defect in the tooth whereby two islands of calcification have failed to coalesce in its development, leaving a break in the continuity of the enamel at that point and a crevice for the ingress of deleterious matter. It should therefore be the constant rule that whenever a cavity on the occlusal surface of a tooth encounters a fissure, the fissure should be drilled out to its extreme end and included in the cavity.

What would appear to be a much preferable method of anchorage to that just considered, and one offering greater security to the filling, is to create a step on the occlusal surface of the tooth at right angles with the approximal portion of the cavity, and extending sufficiently into the occlusal surface to effectively lock the filling into place. This also results in the obliteration of the fissure and the formation of a filling easy of finish. Fig. 17 shows the occlusal surface of a bicuspid with the original cavity *a*,—the form left by many operators,—*b* the fissure, and *c* the line of extension.

With this form of anchorage the filling cannot be displaced short of a fracture of the filling or a stretching of the material at the point where the approximal portion joins the occlusal through repeated impacts of the opposing cusp in mastication. To prevent this the cavity should be made deep enough at this point to allow of sufficient bulk of filling-material for strength, and the material should be thoroughly packed and well condensed to give it the greatest degree of resisting power.

Another point in connection with the dislodgment of these fillings relates to the form of the filling on the occlusal surface, and also the form of the cusps on the opposing teeth. While the general rule holds good that in the formation of fillings they should be made as nearly as possible to reproduce the original form of the tooth, yet in these proximo-occlusal fillings a slight modification of the original form is often advisable. In the natural form we find the marginal ridge of enamel standing more prominent than the enamel between the cusps, thereby receiving greater impact in the process of mastication. If in the insertion of the filling we reproduce the marginal ridge, we subject the filling to too great leverage at a point where it has a tendency to tip it away from its anchorages. This may be avoided by making the filling as high as possible midway between the cusps, and sloping it toward the contact point in such a way as to avoid making a marginal ridge and to present a gradual incline from the highest point between the cusps to the point of contact on the approximal surface. In doing this the occlusal surface of the filling is so presented to the cusp of the opposing tooth that the tendency on closure of the jaws is to force the filling laterally into the cavity instead of lifting it away, as would result if the marginal ridge were reproduced. Fig. 18 *a* shows the section of a bicuspid mesio-distally with filling in place and the marginal ridge reproduced. The cusp of the opposing tooth would tend to tip the filling in the direction indicated by the arrow. Fig. 18 *b* shows sloping filling with the direction of force diverted against the depth of the cavity.

This plan does not materially impair the efficiency of the tooth for mastication, but even if it did lessen the masticating area somewhat it would still be justifiable on the ground that a tooth with its masticating area reduced one-half, but containing a filling safely anchored and enamel so sloped as to avoid fracture, is more valuable than one presenting a full masticating area subject to the danger of filling displacement and fractured enamel-walls. This does not imply that the filling should be made narrower mesiodistally at the contact point than the tooth originally was. For reasons which will appear later the full width of the tooth must be maintained wherever possible. This may result in some instances in the point of contact with the approximating tooth being carried slightly rootwise of the original contact, but if care is exercised this may safely be done without impairing the efficiency of the contact or interfering with the gum-tissue in the interproximal space.

The treatment of the cusps of opposing teeth coming against these fillings is a matter of much importance, particularly with bicuspids. When the sharp buccal cusp of a lower bicuspid impinges so far into a cavity on the opposing upper bicuspid as to necessitate making the filling too thin for strength, or where it passes so far between the cusps of the upper tooth as to form a wedge capable of splitting the tooth, the tip of the cusp on the lower bicuspid should be ground down so as to shorten it and present a broad surface to the upper tooth instead of a wedge shape. This will result in the formation of a thicker and stronger filling in the decayed tooth, and such a change in the direction of force exerted by the lower tooth as to minimize the danger of splitting its opponent. With a wedge-shaped cusp there is much lateral force exerted buccally and lingually against the cusps of the upper tooth, but with a broad, flattened cusp the direction of force is more nearly parallel with the long axis of the tooth and the tendency to split is lessened. This grinding, if done judiciously, will not interfere with the usefulness nor impair the integrity of the lower bicuspid. The enamel is very thick at that point, and there is little liability to decay, so that this method should be employed quite frequently for the greater permanence of our fillings and the greater safety of the teeth, especially in those cases where the cusps of the lower teeth are very prominent and sharp.

One of the most important considerations in the management of these proximo-occlusal cavities relates to the form of the filling on the approximal surface. It should be so built out to a contour that the tooth will be maintained in its proper position in the arch, and that the gum-tissue in the interproximal space shall be protected and preserved in a healthy condition. When the teeth stand in their normal relation in the jaws they are supported on their approximal surfaces by contact with the tooth next in line, and the interproximal space between these points of contact and the border of the alveolar process is filled with gum-tissue. This gum-tissue has an arched form bucco-lingually, with the crest of the arch near the contact point; and this form facilitates the cleansing of the space by a deflection of the food buccally and lingually in mastication. So long as the contact points are small and the space of normal form and filled with gum-tissue, foreign material will not find a lodgment in the space. In the comminution of fibrous food, such as meat, the fibers may occasionally be forced between the contact points, but they are not retained there on account of the narrowness of contact. The succeeding excursion of food on closure of the jaws in passing buccally and lingually along the incline of gum will catch them and carry them with it, leaving the space clean.

When decay takes place on the approximal surface and the contact point breaks down, the teeth, lacking approximal support, have a tendency to drop together, forcing the gum from between them and narrowing the space. In cases of extensive caries the teeth may so change their position as to practically obliterate the space and crush out all of the gum-tissue, leaving the buccal and lingual festoons of the gum more prominent than that portion midway between the teeth. This results in an inverted arch to the gum, and produces a pocket between the teeth which is especially favorable to the reception and retention of food *débris*. Fig. 19 illustrates the approximal surface of a sound lower molar with the gum covering it in a normal arched form; Fig. 20, a similar case, with approximal decay and an inverted arch to the gum, forming a pocket. When caries occurs in this way the necessary procedure to restore the gum to health is to wedge the teeth apart to their original position, and then to so contour the filling that they will be maintained there.

FIG. 19.

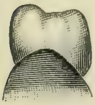


FIG. 20.

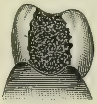


FIG. 21.

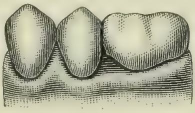
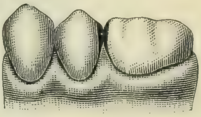


FIG. 22.



If the filling is inserted without this precaution the result is a broad, flat approximal surface to the filling, which will catch fibers of food and retain them to decompose. This wedging of food between teeth is an element of great discomfort to the patient, and a prolific source of failure in these approximal fillings. It not only results in recurrence of decay, but sadly impairs the health of the gum and pericemental membrane. No operation should be considered satisfactory which does not include in its performance a due regard for the form of the interproximal space and the health of the gum-tissue within it.

The attempt to prevent food from wedging between teeth by making broad contacts built tightly against the approximating tooth usually fails in its object through the fact that contact cannot in this way be made so perfect that at times the individual movement of the teeth one against the other will not result in the passage of fibrous food between them. When it once makes its way between the filling and the approximating tooth, it is firmly held there by the broad contact. The only safe form to give these fillings is to make a narrow rounded contact, sufficiently dense to maintain the teeth in position and to preserve its form against the wear occasioned by the individual movement of the teeth. This wear is sometimes quite severe, as is shown by the facets worn in the enamel on the approximal surfaces of many sound teeth. This recalls the fact that these worn facets are often a prolific source of discomfort to the patient, even where there is no decay; and in those cases where a filling is being built in a cavity approximating a tooth with an extensive facet, the margins of the facet should be slightly rounded off to produce an oval form to the surface. The attention of the operator should not be limited to the single tooth being filled, but he should study carefully the adjacent parts, to the end that the teeth and gums in the entire region be placed in the best possible condition.

FIG. 23.

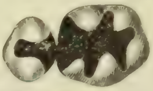


FIG. 24.

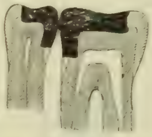


Fig. 21 shows the buccal surfaces of two lower bicuspids and the first molar. There is no decay between the bicuspids, and the contact is normal and gum healthy. Between the second bicuspid and first molar decay has taken place on both approximal surfaces, allowing the teeth to fall together and obliterate the space. The congested buccal festoon of gum is shown opposite the original position of the space. Fig. 22 illustrates the same two teeth when wedged apart and contour fillings made to reproduce the interproximal space. The gum-tissue is seen reoccupying the space in a normal condition. Fig. 23 represents the occlusal aspect of the case, with outline of fillings and point of contact. Fig. 24 shows a section mesio-distally at the contact point.

(To be continued.)

## CONSTRICTED VAULTS.

BY GEORGE S. MONSON, D.M.D., ST. PAUL, MINN.

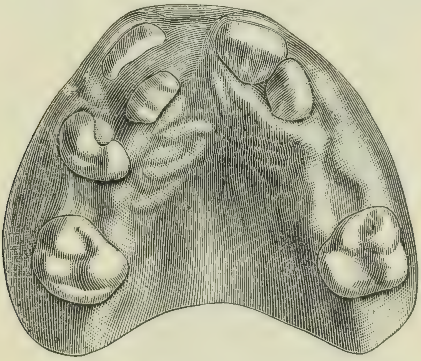
THESE deformities are usually classed under the head of V and saddle-shaped arches. The term "constricted vault" is here used for the reason that more is involved in this deformity than the mere malposition of the teeth.

The predisposing causes of this class of deformities have been a matter of careful study for some time, but still no satisfactory reason has been given for the arrest of development in the palatine process of the superior maxillary bone, which to all appearances seems to be the primary cause, and the crowding of the teeth, with the giving way of the tables of process, as secondary.

Let me quote Dr. S. H. Guilford on this subject: "The causes responsible for this condition are probably shrouded in greater obscurity than those of any other form of irregularity. The crowding of teeth during eruption, delayed eruption or malocclusion, some of which are evidently responsible for many forms of irregularities, cannot be called to an account for this condition."

And so it appears that teeth being apparently passive in their eruption and not having sufficient room in the arch, will follow in the line of least resistance. If the vault were not high, we would in all probability have neither V nor saddle-shaped arches, but have a complicated irregularity, being jumbled in appearance.

FIG. 1.



The development of the vault to accommodate the temporary teeth seems to be perfect in the majority of cases, and when this is accomplished there seems to be no further development until the sixth year. At this time the first permanent molars make their appearance, and with their eruption, or a little later, the development of the palatine process seems to be arrested, while the development of the alveolar process continues with that of the teeth. Where there is not an elongated alveolar process forming a high vault, the process presents the appearance of being piled upon itself, as shown in Fig. 1. In looking at a high constricted vault we are prone to say that the arch needs spreading, but this operation is not confined to cases of this kind; in most cases in which the teeth have not room enough to assume their proper position, it would be well to create room, and there is no better way than to spread the arch.

Fig. 2 represents a section through the superior maxillary bone just back of the first molar; the view is from the back toward the anterior part of the mouth. This being the normal condition the relative average thickness of the bone forming the palatine process can be noted, and also a comparatively straight vomer, the turbinate bones keeping a good distance from the vomer, and also a large space for the free passage of air. This portion of dentistry is of great importance to the nasal specialist who is called upon to enlarge the nasal passage by the use of instruments, as will be seen by a study of Fig. 3, which shows a section through a constricted vault at the same point as in Fig. 2 (the point of observation is the same). This illustration shows a malformed palatine process forming the top of the vault and floor of nasal cavity, upon which the sides of that cavity are supported, oftentimes coming in close proximity to the too often distorted vomer.

FIG. 2.

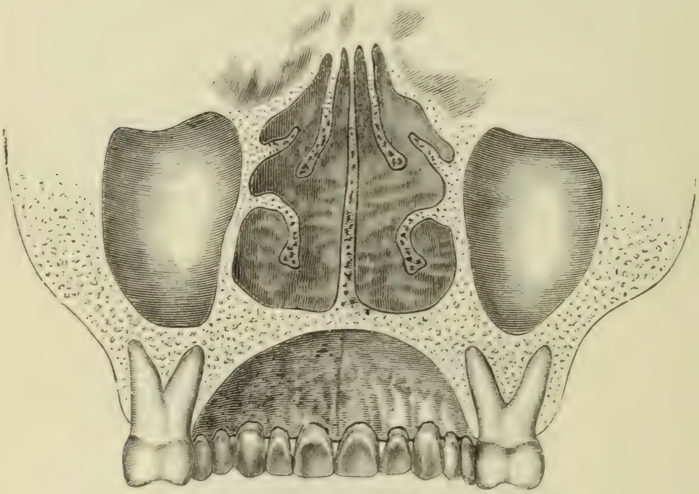
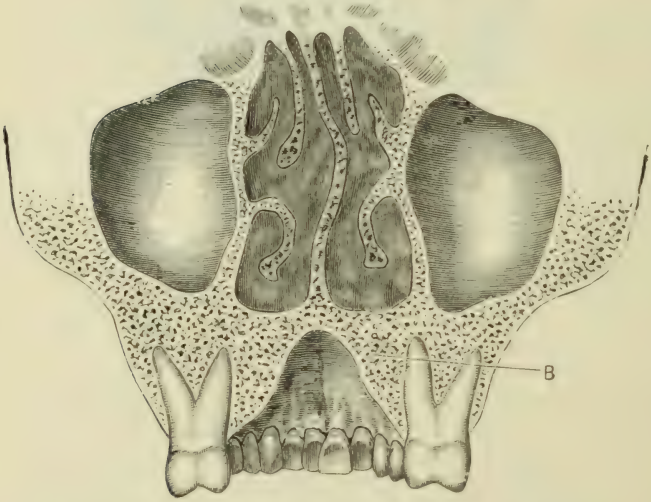


FIG. 3.



There is no doubt that in the majority of such cases we would find adenoid growths, or indications that they once existed. This condition would naturally force a person to mouth-breathing, but not mouth-breathing causing the irregularity of the teeth; and as disuse tends to obliterate or render an organ useless, such is often the case with the nose for the function of breathing.

I hope that in the foregoing I have dropped a hint as to why the bony vault should be stimulated to development, or separated in the suture, thereby enlarging the nasal cavity as well as the vault, thus rendering the patient a double service.

Let us now consider the lines of force necessary to obtain results so desirable.

Fig. 4 is one that I have taken from Dr. Farrar's work on irregularities. It illustrates the movements of the teeth when the force is applied to them to spread the arch. The tooth arch is increased in size, but the palatal portion of the vault is very little changed, the movement mainly being with the teeth and alveolar process on the buccal portion.

FIG. 4.

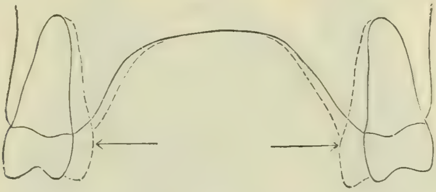
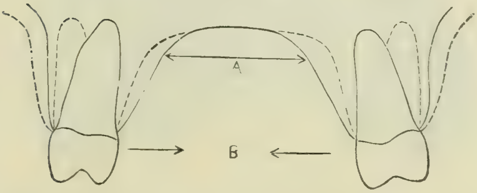


FIG. 5.



This is the trouble with the majority of appliances devised to spread the arch,—they move the teeth, but do not to any great extent widen the vault. The Coffin plate has a slight advantage over those appliances that fasten to the teeth, not bringing pressure to bear on the lingual portion of the maxillary bone.

I will not take up any more of the reader's time in discussing the different appliances, but will at once describe one that has been used in my practice with great success.

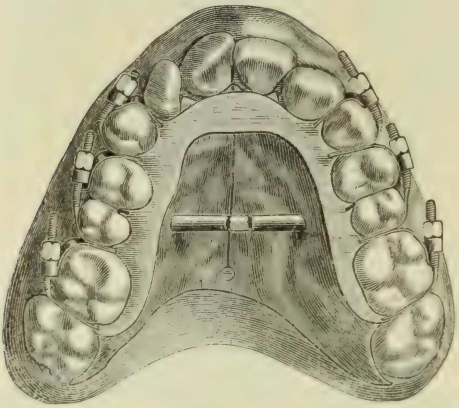
Fig. 5, A, will show where the force should be applied; B will be the point where the teeth should be retained.

The majority of appliances devised for this purpose, as I have said before, exert their force on the teeth, and very little on the lingual portion of the bone.

In the construction of the appliance I am about to describe it is necessary to take an impression of the teeth and adjacent parts. The impression is poured in the usual manner and a model obtained. A die and counter-die are then made, using zinc and lead. With these a plate of German silver, .5 millimeter in thickness, is swaged to fit the vault of the mouth. When this is done, a piece of tubing is soldered in the highest portion of the vault transversely, so as to have the greatest force close to the greatest resistance (Fig. 5, A). The plate is then cut antero-posteriorly in the median line, as in Fig. 6. There are many modifications of this form which can be used to great advantage in the correction of minor cases of irregularity.

The tubing is also cut in the median line and a segment removed sufficient to allow a nut to be placed on the screw-rod which is run in from a hole cut through the plate on palatal portion, opposite the tube. By tightening the nut on the side through which the hole is cut, the lateral diameter will be increased. The reason the long tube is used in this manner and afterward cut is to insure that the lateral sides of the plate shall separate on even lines, giving more even pressure to process and teeth.

FIG. 6.



Now that the jack-plate is finished, let us turn our attention to an appliance that will maintain the crowns of the teeth, and also the plate in position, until such time as the highest portion of the vault is widened.

A plaster model of the case is cut down to the gingival line, forming a type to be used for printing on paper, using printers' ink and pad. (The print will be as in Fig. 7.) The line drawn lingually will represent the paper pattern. This pattern is reproduced in German silver, using plate 1.5 millimeters in thickness. This plate should be about 3 millimeters in width on the sides, but slightly broader in front where the stress is greater, as the force from the jack in the vault is increased.

At the interdental points on this plate, opposite the bicuspids and molars, it is sawed in about 1 millimeter; into these cuts folded bands are forced and soldered (Fig. 8), soft solder being sufficient to hold them in position. These bands pass through the interdental spaces, and on the ends of them are soldered loops and screw-rods in such a manner as to allow them to be tightened around the respective teeth. I might say here that the loops and screws are fastened with silver solder to the bands before they are attached to the plate with soft solder. You will notice that this plate for retention is not cut in the median line, but is solid throughout its length, thus giving to us a greater line of resistance than that of the palatine process; the latter, being the lesser, will yield first, thereby widening the top of the vault and the floor of the nasal cavity, avoiding the tipping of the crowns of the teeth out and the roots in (see note), as the cut I have reproduced does not show, and in this manner diminishing the top of the vault instead of widening it as is so frequently done with those appliances which press the teeth at their neck. It will be noticed that this plate serves in a double capacity in that it holds the crowns of the teeth in position and prevents the plate that is exerting its force on the palatine portion of the bone from being displaced until the upper part of the vault carrying the roots of the teeth is sufficiently expanded. When this is accomplished, the bands may be relaxed or removed, and bands without the plate put on the teeth to prevent

FIG. 7.

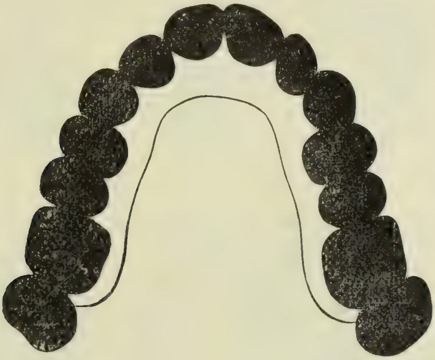
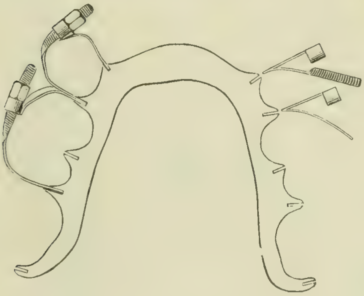


FIG. 8.



the jack-plate from being displaced until such time as the tooth arch is enlarged.

The plates, bands, and other appliances may be made of any metal preferred; in my practice I employ eighteen to twenty per cent. German silver, as indicated in my paper, not only because I have found it to sustain the necessary strain of the screw better than any other I have used, with the possible exception of the alloy of platinum and gold sold under the name of clasp metal, but also, and more especially, because I have found the danger of softening of the enamel under the bands greatly lessened, if not wholly avoided, and I consider the temporary annoyance of the slight discoloration of the appliance more than compensated by the permanent disfigurement of a filling should decay follow the use of the bands made of other metals.

Note.—When force is applied to a tooth from the lingual side at the gingival line the tooth acts as a lever, and the buccal portion of the process in which it is set serves as a fulcrum, thus giving the apex of the tooth a radius which would be determined by the rigidity of the cancellous portion of the bone.

## REMOVABLE-FACING CROWN- AND BRIDGE-WORK.

BY H. W. HOWE, D.D.S., CITY OF MEXICO.

Take, for instance, a case to bridge from the superior second molars, with the cuspids present. Make first for the molars, caps or crowns having flat tops, with straight or parallel sides, to be fixed on permanently; but better to have them just a very little curve-shaped, leaving a space between the flat top and the lower articulation for a solid crown, if for removable work. Remove the crowns from the molars, fill them with good plaster, and when hard, perfectly fit a strong band for the telescoping crown, without changing the form of the first one made. Remove the plaster, put them back on the molars with the rings in place, take an impression and articulation for each crown with a piece of wax, separate the ring from the crown, put the ring into the impression, make an articulating cast, articulate the solid crown, mark it, remove from the plaster model, and solder with fine solder. The molars being ready for the cuspids, make these as shown in the cut Fig. 1, but with the posts hooked or turned out as much as the case will permit. One can always make these posts parallel, and parallel also to one molar whatever the angle of the cuspids' roots are. If one molar stands inclined, use the dovetail connection (without the telescopic crown) shown in Figs. 6 and 7. Fig. 2 shows a cuspid collar and post, which is extended and curved as at A. This, with its duplicate, should be placed on the cuspid piers and, while the molar caps are in place on their piers, an articulating impression is to be taken, and the casts fixed on the articulator. Grind the facings to suit, and back them with thin platinum, providing the extensions as shown at B, Fig. 3. Shape A, Fig. 2, to the required angle with the post, and so as to clear the facing pins. Wax and remove the backing and post from the cast and facing, invest and solder. Burnish a thin platinum box to fit A, put it in place on the cast and on A, wax backing and facing to place; fit a half collar as C, fit a floor-piece around the box, wax all in place; remove from A; take off the facing, insert lead-pencil points (No. 4) in the backing-holes, fill the box with plumbago, and paint the facing-side of the backing with plumbago. Invest the case and contour with solder to produce the result shown in Fig. 3, which, when placed on Fig. 2, will look like Fig. 1. The assembled parts are shown clearly in Figs. 4 and 5. Carefully take an articulating impression with all of the molar crowns and cuspids in place, but take the impression for work with the removable cuspid facings off, leaving the abutments on. Remove the inside flat top crown from the cap crown in the impression. Make the cast with sand and plaster, using asbestos ground fine in a mortar with the sand.

FIG. 1.

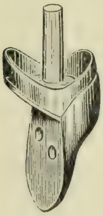


FIG. 2.

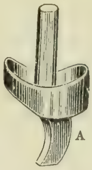


FIG. 3.

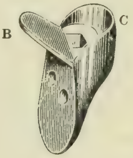


FIG. 4.

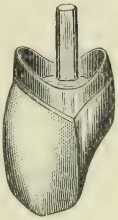


FIG. 5.

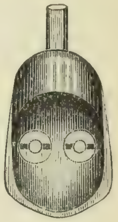


FIG. 6.

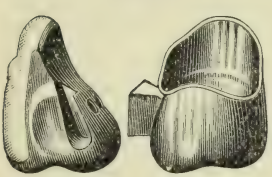


FIG. 7.

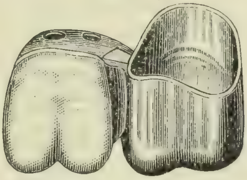


FIG. 8.

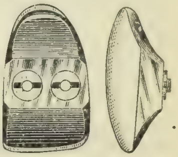


FIG. 9.

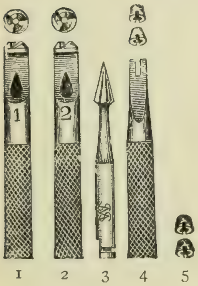


FIG. 10.

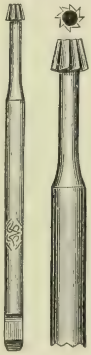


FIG. 11.

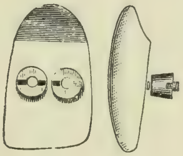
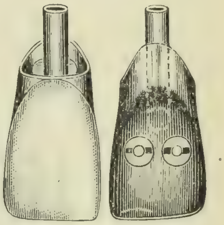


FIG. 12.



Articulate the case, grind the facings to suit (two sets if you like, as you may need duplicates sometimes, but are not likely to). Back one set with thin platinum, filing the backings while on the facings to perfectly fit at the edges. Fit a platinum backing over this with extra holes punched through for solder or gold to flow between the backings. The pin-holes are to be a little larger than the pins. Wax the backings to the facings. Put on little side boards of platinum, as shown in Fig. 8. Remove the two backings together from the facing, paint the exposed face of thin backing with plumbago. Take "ever-pointed" lead-pencil points No. 4 and pass through the pin-holes into the wax to project from both sides of the backing. Invest in a little pumice and plaster, boil out the wax, dry out and contour with 22-carat gold to any desired thickness. You will find that the gold backing has good square edges for the final fitting, owing to the sideboards, and requires but little solder. Boil out the borax or flux, drill out the pencil points, put on the facings, touch the pin-ends with *soft* wax, file to articulation. Use sticky hard wax to get the arrangement as you wish it. With a thin blade separate the facings from both backings. Warm the teeth with a hot instrument, as they come off easier. Do not forget the pencil points, but use them as before. Heat them, run them through into the wax, paint the front surfaces of the backings again with plumbago (solder will not run where it is), and invest the case with sand asbestos and plaster; dry out and solder with 20-carat standard solder. Cool, boil out in acid or alum, clean out the pin-holes, fit on the facings, see that they are right and remove them. Ream out the pin-holes with the reamer No. 3, Fig. 9, to fit the gold nuts. Or put on the facings, and with this reamer, Fig. 10, which fits over the pins (see enlarged view), ream out the pin-holes to fit the nuts, No. 5, Fig. 9, shown enlarged in Fig. 8. Carefully cut the threads on the pins with a backward and forward turn of the dies, Nos. 1 and 2, Fig. 9, putting oil on the pins and using first No. 1, followed by No. 2. Fig. 11 shows the nuts screwed onto a facing, which is shown in Fig. 8 screwed onto its backing. Screw on the facings in a filmy bed of S. S. White's pellets of soft gutta-percha, having the case suitably warm, and dress off the pins and nuts flush with the backings. Where the pin-holes are deep in the molars, put the nuts clear down and fill up the holes over the nuts with foil. If the collars on the cuspids extend clear around the roots, I prefer the hollow posts as shown in Fig. 12, for I am then sure that the abutments go home, as the excess goes out at the point of the hollow post and every part of the post is enveloped with cement. I use a suitable pencil point in the hollow post, so that the solder will not fill the hole in the backing. I also make a hole in the fixed or first cap crown, and fill the hole with foil afterward. Put a finger over the hole as you press the crown home, until sure that every part of the molar is covered with cement. Remove the finger and continue to press the crown home. To place the finished denture in the mouth, put the cuspids on first, and push the piece up and backward on the arc of a circle from the cuspid posts. This work is more to my mind if the piece is put on a very narrow struck or swaged plate, as it gives better satisfaction in every way.

Although I have shown here my method of constructing a removable bridge based on telescoping molar cap crowns or dovetail attachments and special cuspid organizations, yet it is obvious that the piers and superstructures may be made in any of the well-known ways and be provided with the removable facings substantially as herein described.

Single Richmond crowns are made the same as for bridge-work. By using the old-fashioned single gum teeth, nicely rimmed, one can contour to give facial expression. Dentures are made by the method described, using for solder the prepared solder fillings, putting on plenty and keeping the piece hot from below a longer time, so that the solder may run between the thin backings and plate behind the gums, thereby doing away with the objectionable feature of the old style of gold plates, which were filthy from food accumulation. When making this work, thinner backings may be used with even short-pin teeth. They are strong enough, and even old-fashioned gum molars may be used, avoiding the objectionable showing of the gold. The thread is cut so perfect on the pins that one can pull the pins out of the facing from even a short-pin tooth without stripping the thread. In making lower molar bridges, it is often necessary to dovetail both ends of the work on account of the position or angle of the abutments. I have been making this style of removable-facing bridge-work since 1891.

# COMMENTS ON DR. FOSTER'S PAPER ON COCAIN POISONING.

BY G. LENOX CURTIS, M.D., NEW YORK, N. Y.

In the September number of the DENTAL COSMOS Dr. M. W. Foster, of Baltimore, in writing on the "Toxic Effect of Cocain induced through Cataphoresis, applied to a Pulp preparatory to its Removal," describes a very interesting case which should lead to an extensive discussion on the use of cocain, in order that men throughout the world may give their personal experience in both its local and general effects. There are so many phases of its toxic effect that no one writer would be likely to include them all. My experience in the use of cocain during the past fourteen years has been varied. I cannot agree with Paul Bert, who says "the action of cocain is purely local," for I have had many a narrow escape from losing my patient through its extreme general effect. I have also had many cases where its local effect was absolutely wanting, and I have had at least one-half dozen cases similar to the one in question described by Dr. Foster, where the body became numb even to the tips of the fingers. In two of these cases the symptoms were pronounced within two minutes after the injection of cocain. In these latter cases it is but fair to state I employed a saturated solution, which is my present custom, as now, with its antidote, volasem, I do not feel any hesitancy in using cocain as freely as I would water. My work in oral surgery is simplified by the use of a local anesthetic, and cocain is the most satisfactory one I have employed. Where I once used general anesthetics in a large percentage of my cases, I now rarely find them necessary; but this has been entirely brought about by the use of volasem. In a recent case, where I had forgotten to give the volasem prior to the injection of one-half drachm of a saturated solution, complete unconsciousness of the patient and rigidity of the muscles, followed by delirium and effort to fight (the patient having several times violently struck my assistant), was the result. I could not understand this condition until I saw that the volasem I had prepared had not been administered. I immediately forced the patient to swallow it, and within two minutes he was entirely conscious and in a normal condition. He stated he had no knowledge whatsoever of the operation or of any acts committed by him, but he did remember he imagined himself Fitzsimmons, the prize-fighter. Except for his dentist (who was present) assuring him of his condition, he said he could not have believed it. For the purpose of obtunding sensitive dentin or pulp preparatory to removing it, as in the case of pulp-stones, it is my custom, after drying the cavity with a hot blast, to pack it with cocain crystals, sealing it and allowing the drug to remain from thirty to sixty minutes. By this means I have been able to complete the work perfectly without pain.

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# GOMPHIASIS.

BY W. SANFORD COTTRILL, WORCESTER, ENGLAND.

It is not my object in this short paper to introduce a new disease, or to suggest a treatment of a disease, but to introduce a technical name to the profession. Perhaps it would be more correct to say revive a name. If a certain disease possesses a proper scientific name, why, in these enlightened days, should it not be called by that name? Gomphiasis (from the Greek *γομφος*) is the correct form of speaking of the disease of the teeth when they loosen in their sockets, and, unless treated, finally fall out. Now this is what we frequently meet with in practice. I have read many dental books on the causes and treatment of such cases, but never have I yet come across the term "Gomphiasis" as applied to it. Further, I have asked several dental and medical practitioners if they knew what the term meant, and they have all replied in the negative.

Now what is my authority for stating that Gomphiasis is a proper medical term?

I refer the interrogator to a really *good* dictionary, such as "Webster," for there he will see:

*Gomphosis*, "the immovable articulation of the teeth with the jawbone," and again, *Gomphiasis*, "a disease of the teeth, when they loosen and fall out."

This I consider fair proof that Gomphiasis is a proper scientific dental term, and again I ask why it is not classed in our text-books with necrosis, exostosis, and other diseases.

# CORRESPONDENCE.

## CORRECTION.

To the Editor of the Dental Cosmos:

*Sir,*—In the October number of the Dental Cosmos, page 834, report of proceedings of the Dental Society of the State of New York, I am reported as saying that the origin of the dental pulp is from the inner wall of the tooth-sac. The cementum was the general tissue under consideration, and this was the structure referred to, not the tooth-pulp.

Very truly, I. N. Broomell.

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# PROCEEDINGS OF SOCIETIES.

## NATIONAL DENTAL ASSOCIATION—SOUTHERN BRANCH.

The first session of the Southern Dental Association as a branch of the National Dental Association was held in St. Augustine, Fla., February 22 to 25, 1898.

The meeting was called to order at 11 A.M., February 22, by the president, Dr. E. P. Beadles, Danville, Va. After an invocation by Rev. S. Hamilton Day, of St. Augustine, an address of welcome on behalf of the State Dental Society of Florida was delivered by Dr. J. N. Jones, Jacksonville, following which Dr. S. Ewing Smith, St. Augustine, Fla., president of the Florida Dental Association, tendered a welcome to the visiting dentists in behalf of the dentists and citizens of St. Augustine.

The annual address of the president was then read. In it he reviewed at length the vital questions affecting the present status and rate of progress in dentistry, laying particular stress upon the importance of organized effort in smoothing out the misunderstandings which tend to arrest our professional development. His plea for more harmonious relationship between the boards of examiners and college faculties was a strong one, and an able exposition of their existing relations.

The status of the patent question, of insurance examination, of the army and navy service, in so far as they were related to dentistry, were clearly and suggestively presented, and the address as a whole contained many helpful suggestions toward an increased activity of interest in the more prominent features affecting the welfare of the dental profession in this country as a whole.

A committee consisting of Dr. L. G. Noel and B. Holly Smith was appointed to consider and report upon the address, the report of the committee and the discussion thereof being made the regular order of the evening session.

A telegram of greetings from the Odontological Society of Chicago in convention assembled was received and read by the secretary, who was on motion instructed to return fraternal greetings in the name of the Southern Branch Association.

After the transaction of some routine business, the association adjourned until the afternoon.

### *Afternoon Session.*

The association convened at 3 P.M., pursuant to adjournment, the president presiding. The secretary read a communication from Dr. Ottolengui, chairman of a committee of the New York State Dental Society, relative to a movement inaugurated in that society with a view to securing national legislation restricting the issuance of patents "upon any process or method of treating human disease, or upon any process or method of restoring or replacing any lost part of the human body, except upon artificial substitutes, whole or in sections, which may be manufactured, sold, and delivered without the exaction of any fee, license, or royalty beyond the common selling price of the manufactured article." On motion, the communication was referred to the Executive Committee.

Dr. L. G. NOEL, chairman of the committee on revision of the constitution, then offered the report of his committee, which set forth that, having compared the constitution of the Southern Dental Association adopted at Atlanta in November, 1895, with the constitution of the National Dental Association adopted at Old Point Comfort in August, 1897, they had made such changes in form as seemed necessary to adapt it to the working of the Southern Dental Association as a branch of the National, harmonizing it with the constitution of the latter body.

After a general discussion of the proposed changes, the report was, on motion of Dr. Cowardin, adopted.

Dr. J. Y. CRAWFORD then offered the following resolution: "That we do now declare ourselves the Southern Branch of the National Dental Association, to be known as the Southern Dental Association." The resolution was unanimously carried.

The Executive Committee submitted the following report on Dr. Ottolengui's communication:

"*Resolved*, That the Southern Dental Association, as a Branch of the National, indorses and approves the efforts of Dr. Ottolengui to have the patent laws so amended as to correct the evils now existing pertaining to dentistry." Signed by H. H. Johnson, E. G. Quattlebaum. The resolution was carried, and the corresponding secretary was instructed to notify Dr. Ottolengui of the action of the association, after which the convention adjourned until 8 P.M.

### *Evening Session.*

The association was called to order pursuant to adjournment at 8 P.M., the special order of business being the report of the committee on the president's address. As the chairman of the said committee was not present, the report of the Committee on Operative Dentistry was called for, and reported verbally that no report from members of the committee had been received. But one paper had been presented, by Dr. L. F. FRINK, of Lake City, Fla., which on motion was read by the chairman, Dr. Brabson, as follows:

## FAILURES IN OPERATIVE DENTISTRY.

Who is there among us who does not have failures, and why? I shall attempt to mention briefly a few of the most important causes.

Chief among these is dull instruments; especially is this the case with burs. We defer ordering new ones to a future day and toil on with the same old burs, causing greater friction, more pain, even endangering the life of the pulp and at last an improperly prepared cavity.

The use of sharp excavators or chisels to pare away the thin marginal walls is necessary, especially at the cervical wall. No first-class mechanic will attempt to finish up a nice piece of work with dull tools, then how much more important is it in this high calling of ours.

We should use the best instruments and replenish our supply of burs often, remembering that however good an instrument may be, it cannot last always.

Again, we have failures from filling in too close proximity to the pulp. I deem it best to leave some discolored dentin immediately over the pulp rather than excavate too near.

In our eagerness to complete a piece of work and thus obtain the fee, a wrong selection of material is made. A gold filling is used when cement or amalgam is indicated.

This is often done to please the patient. While I shall always advocate the use of gold, yet there are cases where cement fillings preserve the tooth much better than the metallic fillings.

No gold fillings will stand unless thoroughly condensed.

Too often we see the mistake of failure to remove salivary calculus. This brings to mind the oft-repeated injunction of our honored professor, Dr. James Truman: first examine the mouth, second clean the teeth, then you can see more clearly what should be the treatment. I am truly sorry that in this enlightened age there should be found those having mouths in which, did we not use the scaler freely, we would never find the cavities to be filled. In such mouths the best fillings by the most skillful operators are failures.

Let us impress upon the minds of our patients the grand lesson of cleanliness in the mouth as well as of the body. When thus educated we will soon find that we have fewer failures in operative dentistry.

### *Discussion.*

Dr. W. E. WALKER, Pass Christian, Miss. I wish to emphasize the importance of sharp burs. That this is really an important element in saving pain to our patients would seem to be an unheard-of idea to some men, judging from the dull burs which I see being used in some offices. My rule is that if the edge of a bur blade can be *seen* it is to be laid aside; when the dull ones accumulate in sufficient quantity they are sent to the factory to be resharpened.

The CHAIR. Some burs are so very small that it would seem difficult to see the edge.

Dr. WALKER. By holding them up in a good light the edge can be seen, though in the case of some a jeweler's glass may be needed.

Dr. E. G. QUATTLEBAUM. I can't tell anything about a bur until I try it in the mouth. I have a great deal of trouble in that line.

Dr. L. M. COWARDIN. Try it on the edge of the nail; if it slips it is no good.

Dr. WALKER. That is a very good way, but it is more tedious than holding it up in a good light and looking at it as you roll it over; look across the end as the light shines on it, and unless it has the necessary keen, sharp edge *you can see it*. In the best burs—the "Revelation" burs—the cross blades over the top dull the most frequently. If Dr. Quattlebaum would try this method he would avoid the unpleasant results of *trying* a dull bur on the patient's teeth.

Dr. S. B. COOK. I do not think there is much difficulty in recognizing when your bur is dull, and as soon as it refuses to cut, throw it away and it will not trouble you again. The "Revelation" burs cut very well for a little while, but they soon get dull, and then you can't do anything with them. The cross-cut burs are much more satisfactory to use. They cut twice as fast as any others that I have ever tried; they take hold of the enamel,—not a great big, deep paring; they tear it up in little bits of grooves. If you have not tried the cross-cut burs you would do well to experiment with them. I think you would like them very much. One of these burs will do as much work as three of any other make that I have tried.

Dr. QUATTLEBAUM. Who makes them?

Dr. COOK. They are an English design, made in fissure and inverted cone forms. I got the last from the Dearborn Dental Manufacturing Co., Chicago. There is also one for enlarging pulp-canals. A cross-cut bur will cut off a front tooth very quickly. Another point in the paper I would speak of is the use of gold when other materials would serve a better purpose. Many teeth can be saved by the use of cement or amalgam that gold would not save. This point should always be borne in mind by the dentist. The matter of larger fees is sometimes a great temptation, but one should always choose that which will do the best service.

Dr. CHAS. SILL. Mention was made in the paper of leaving carious matter in the bottom of the cavity. It has been my practice for years, when a cavity is so deep that thorough removal of carious dentin would expose the pulp, to leave a layer over the pulp, covering it with gutta-percha,—not dissolving it in chloroform, however, but merely dipping a thin slice of gutta-percha in chloroform, sufficiently to dissolve a film on the surface, making it adhesive; then, evaporating the chloroform, lay it in the bottom of the cavity and fill over it. It will do better work than gutta-percha dissolved in chloroform. As a non-conductor, gutta-percha is good any way you use it.

Dr. S. W. FOSTER. The point in the paper which appeals to my mind as of the greatest importance is the care to be exercised in the preparation of margins. Failure in this respect is the cause of more failures in operative dentistry than any other one thing. The kind of material used for filling is of minor importance compared with the proper preparation of the margins of cavities. I wish to emphasize that point; imperfect enamel edges will surely result in undermining caries later on. The average operator is in too great a hurry, and does not give himself time to prepare his margins properly; he does not give himself time to separate the teeth sufficiently to enable him to get at the margins properly. The teeth should be separated with cotton for several days; this will give sufficient space to trim away and round up the margins. Whether the material used is gold, cement, or amalgam, success depends upon the proper preparation of the margins of the cavity.

Dr. H. H. JOHNSON, Macon, Ga. The fissure cross-cut burs originated in Germany. In 1890, when I was traveling in Europe, I got hold of a half-dozen which I used with great satisfaction. I have not been able to find the same grade in this country until very recently. They are a very superior bur, and any one who tries them will be perfectly satisfied with the results obtained.

Dr. L. M. COWARDIN. I regret that I was not here to hear the paper, but in the discussion I have heard reference made to leaving decayed dentin in the bottom of the cavity when—

Dr. WALKER. The essayist used the words "discolored dentin"; he did not speak of decayed dentin.

Dr. COWARDIN. I did not hear the paper, but Dr. Sill spoke of leaving decay when the pulp was near exposure, and capping with gutta-percha. I feared the impression was general that that idea was indorsed in the paper. In my earlier practice it was my custom to leave semi-devitalized dentin in the bottom of a cavity, rather than destroy the pulp. But the result was a succession of abscesses and other disagreeable conditions, pulpitis, etc. I am happy to say that with my present practice I rarely have an abscess as the result of a dead pulp. I now remove everything except sound dentin, regardless of pulp-exposure, and especially from the bottom of the cavity. If the pulp is that near exposure I destroy it, remove it, and fill the canals. I never leave any decayed dentin in proximity to the pulp. If I did I should expect trouble to follow.

Dr. QUATTLEBAUM. I never expose a pulp if I can avoid it by leaving a layer of semi-devitalized dentin, which I thoroughly sterilize. Then I varnish the cavity, put in a little cement, with gutta-percha over that, and I have fewer abscesses than any man with whose practice I am familiar. The trouble with others probably comes from not sterilizing the dentin; if left septic it must of course give trouble. It must be rendered aseptic, like any other foreign material near an exposed pulp.

Dr. FRANK HOLLAND. How do you sterilize it thoroughly? How long does it take?

Dr. QUATTLEBAUM. I do not leave any great quantity of it, and I apply pure carbolic acid, ninety-five per cent. There is nothing better than that.

Dr. COWARDIN. Carbolic acid will not sterilize it unless through its escharotic effect. It will coagulate albumen and by that means injure the pulp, so that sooner or later the result will be a diseased pulp. At least that has been my experience.

Dr. SILL. For sterilization I use hydrogen peroxid. It is more thorough in its action than anything else I have tried. In a very few moments its action on the parts is complete. In an experience of three or four years with this method I have had no such trouble as when I used creasote, or carbolic acid. The results are much more satisfactory.

Dr. L. G. NOEL. I am something of a disciple of Dr. Flagg in the removal of all diseased dentin. If, however, I nearly expose a pulp in excavating, and there has been no peridental inflammation, no inflammation of the pulp, I may leave a little softened dentin in the cavity, and sterilize it. I do not want to kill a pulp that is in a healthy condition.

Dr. COWARDIN. You do not consider a pulp diseased unless there has been peridental inflammation?

Dr. NOEL. I do not consider that it is not amenable to treatment, unless it responds to tapping. If there is inflammation of the peridental membrane I treat it with beechwood creasote. After treating it with creasote for a day or more, I place hydronaphthol-cement in the bottom of the cavity, without any other cavity lining, unless it is that recommended by Professor Flagg,—pure caoutchouc dissolved in chloroform, or gum mastic in chloroform. The latter makes a very satisfactory cavity lining. Hydronaphthol, used as recommended by Dr. Stowell, makes a very satisfactory pulp-covering, mixing one-third hydronaphthol powder to two-thirds of any cement powder, mixed as any ordinary cement. I have used this in fifty or sixty cases of actual exposure, without a single case of subsequent trouble.

Dr. J. N. JONES. Do you employ the same methods where there is inflammation?

Dr. NOEL. It is necessary to wait until all peridental inflammation has subsided.

Dr. F. HOLLAND. You say you treat for a day or two with creasote; what quantity?

Dr. NOEL. I use it quite liberally, first saturating the cavity walls; then I put some on spunk or cotton and seal it up in the cavity from one sitting to another. It is surprising how promptly the inflammation will subside. But if it refuses to abate within forty-eight hours, arsenic is the proper application.

Dr. B. Holly Smith. I feel that it is quite possible that a good deal of our treatment is done empirically. If I had to treat diseased soft parts in which there was inflammation, as the eye, or the mucous membrane, dermal surfaces, and especially when there was any liability of an exposed nerve, and it should be suggested to me that I try the effect of escharotics,—agents which destroy tissue,—such a suggestion would make a peculiar impression on my mind. I know that nitrate of silver is used by oculists in the treatment of that most delicate organ, the eye, but I must say that I think we have gone too far in the use of such concentrated agents as carbolic acid, creasote, etc. I often wonder that the parts will stand as much as they do, and I feel that our efforts at sterilization are not effective, because it is impracticable to keep such agents in a sufficiently concentrated form in contact with the tissues a sufficient length of time to secure the desired result. Merely wiping out a cavity with carbolic acid cannot sterilize carious dentin. This can only be effected by repeated applications, or by leaving it in contact a long time. Sealing it in as a temporary filling may perhaps render it aseptic.

Dr. Quattlebaum. If the cavity is first thoroughly dried by blasts of warm air, why will not pure carbolic acid, which has a great affinity for water, penetrate those dry walls and sterilize the dentin?

Dr. B. Holly Smith. I am not prepared to say positively that it will not do it. But it will soon erect a barrier against itself, preventing any further penetration. If a cavity has been once medicated with carbolic acid, it is useless to treat it later with any other agent; it would not be effective. Hydronaphthol in alcohol will penetrate more deeply than carbolic acid.

Dr. Quattlebaum. Much depends on the depth to which you want it to penetrate. I propose to leave merely a film of decalcified dentin to avoid actual exposure of the pulp.

Dr. B. H. Smith. I am not indorsing any particular drug, and I may be entirely in the wrong; but I ask if it is not the judgment of the gentlemen present that we do use too powerful agents, and in too concentrated form. What is the *rationale* of such treatment? What are we trying to effect with carbolic acid? Are we working intelligently? Do not our failures indicate that some other line of treatment is needed? Hydronaphthol has powerful antiseptic qualities. I do not know but that hydronaphthol and powdered cinnamon might make an efficacious aromatic antiseptic paste. But I really believe our tooth-medication is too radical, and that we should proceed more cautiously.

Dr. Quattlebaum. I acknowledge that I was taught by Dr. Flagg not to use carbolic acid, but in my experience it has proved to be good practice, as shown in the results.

Dr. Smith. Cicatricial tissue is not favorable to the return of the pulp to normal conditions.

Dr. Frank Holland. I wish to add that probably I am not as careful in my manipulations as Dr. Quattlebaum, who applies powerful escharotics to a film of semi-decalcified dentin in the bottom of a cavity; but I am very sure that if I did that, I should kill the pulp. (*A voice.* "You're right.") In trying to kill out the microbes with carbolic acid you imagine you are sterilizing the dentin, but *you don't do it;* you simply anesthetize the pulp; you can put it on any delicate tissue and absolutely anesthetize it. That is why death by swallowing carbolic acid is the most painless known. On the line of Dr. Smith's statement that our methods of treatment are too radical, I would say that nature is a great restorer, and I cannot agree that the use of so many powerful drugs in the treatment of dead teeth is necessary.

Dr. NOEL. Dr. J. S. King, of Pittsburg, many years ago called my attention to his method of pulp-capping, which I adopted and have used successfully in hundreds of cases of traumatically exposed pulps,—exposed in excavating, I mean. It was simply a small quantity of pure creasote made into a paste with the powder of what was then called *os-artificiel.* I used oxid of zinc, mixing it to a consistence somewhat thicker than cream, and applying it directly to the pulp, first saturating the cavity with the creasote after washing it out with warm water, and then filling with oxychlorid of zinc over that; later the oxyphosphate came in. In my own mouth I have a tooth in which an exposed pulp was treated in that way many years ago and filled by Gordon White. You are at liberty to examine it, and I guarantee that you will find that it is a live tooth to-day. Since reading Dr. Stowell's article I have modified my method by using hydronaphthol as I have described, but there has not been sufficient time to settle the question of superiority over the old method, which I used for twenty years. Dr. Flagg has said that if the pulp does not die after exposure there will be a formation of secondary dentin,—a recalcification of the decalcified tissue. He says he has repeatedly found this to be the case. I have never had occasion to remove any of mine, so I cannot say whether or not that is the case.

Dr. JONES. What about the dentin that has been medicated with carbolic acid?

Dr. NOEL. I do not use carbolic acid. As I have said, I use only pure beechwood creasote.

Dr. HOLLAND. I can kill the pulp every time with three applications of creasote; it is even more escharotic than carbolic acid.

Dr. QUATTLEBAUM. If carbolic acid is as powerful an anesthetic as has been stated, it ought to be a good application for sensitive dentin.

Dr. WALKER. You appear to mean that as a joke, but Dr. J. N. Crouse, of Chicago, recommends the alternate application of carbolic acid and tincture of aconite as desirable obtundents for sensitive dentin. I have tried it on his recommendation, and find it very satisfactory.

(To be continued.)

# SEVENTH DISTRICT DENTAL SOCIETY OF NEW YORK.

(Concluded from page 778.)

DR. FRED. M. ROOD, Rochester, read the following paper:

## SOME PRACTICAL POINTS IN CROWN- AND BRIDGE-WORK.

As we all know, the very first matter for consideration when planning crown- or bridge-work is the teeth to be used for foundations, and the first question is, Can the teeth be filled? If the teeth can be filled, it would be in most cases better practice to fill than to crown them. The esthetic effect of contour filling is much better than that of any crown. After, however, deciding that a tooth should be crowned, the next thing is to decide whether the pulp can be saved alive. A pulp should not be sacrificed needlessly, as its preservation is a matter of importance both to the patient and to the dentist. Take, for illustration, a typical case of bridge-work from cuspid to molars. What do we consider best practice, the use of a full gold crown, an open-faced crown, or a facing on a gold crown for the cuspid? From experience in the use of each kind, I would say all are good in their place, but, as I before observed, a pulp should not be sacrificed without a good and conscientious reason, because the tooth cannot possibly be improved by destroying the pulp.

The next matter for consideration is the articulating surfaces, for I have found it quite as necessary to know when not to articulate in such a type of bridge as it is in some others to get a perfect articulation. For instance, in a case where we have for occluding surface just two bicuspids. I have seen two such cases where the leverage on the bridge has thrown the cuspid out so as to make a very unsightly appearance, necessitating what we most wished to avoid,—*i.e.* excising the cuspids to bring them again in position in the dental arch.

The next consideration is how to make the pier. Which is better, to use a seamless crown, or a band with the cusps soldered on later? I had until quite recently practiced the method with the band, because of the possibility of better fitting the tooth than with a seamless crown, but Dr. Greene, of Geneva, recently demonstrated a method whereby an accurate measure can be taken with a thin copper strip and a fusible die made, over which to swage or fit a band in a very few minutes. This makes a seamless crown possible of equal value to one made by the other process. I have now provided myself with the outfit for this work, and intend to use it in the future.

My next observation would be to use 28 gauge gold and fill the cusps well with solder or snippings from coin gold that it may be possible, if necessary, to repair the case without making a new one, for who has not experienced the havoc made by a porcelain tooth articulating on a gold crown? I would suggest a method of backing and tipping the cutting-edge without having to heat the porcelain tooth, as follows: Take No. 28 gauge of pure gold, or two pieces of 32 gauge, punch the holes for pins and burnish over the cutting-edge of the porcelain tooth. Slip off the backing and solder a strip of gold plate the width of the tooth, place the backing on the tooth, and it can then be filed to a finish which is very pleasing. Also for tipping use can be made of the gold that comes from a piece finished with a carborundum wheel. A strip can be rolled from the gold; it has the light color of clasp metal given by the aluminum crystals, and I think it a good color to expose. The same strip can be used for clasps if not annealed after rolling.

Dr. J. H. Beebe said that what Dr. Rood said of articulation reminded him of a case he had several years ago, where he cast the grinding-surface to the articulation. He found this a good plan and had repeated it several times since, especially when the tooth was sensitive and it was hard to get it ground down to articulate correctly. In regard to seamless crowns, these cannot be as strong as a band crown, because the strain comes across the grain of the metal.

A paper by Dr. J. Foster Flagg, entitled "What is It?" was read by the secretary. (Dr. Flagg's paper was published in the Dental Cosmos for July, p. 547.)

*Discussion.*

Dr. Wm. W. Belcher said, with no desire to belittle the work of Dr. Black, it is self-evident that this investigation has in a large degree only served to make us suspicious of a material that has well served its purpose in the past. This unrest we can view with calmness, as an essential to a transitory period that perchance may give us some time in the future a material of increased efficiency. But for the present it has only served to awaken discontent. We have been promised a loaf of most exceeding richness, and thus far received a stone.

As a result of Dr. Black's experiments a formula has been promulgated that is said to be the essential of all that is good in dental alloys,—silver 68.5, tin 25.5, gold 5, zinc 1.

In the final conclusions reached there is a surprising similarity to the early formula of Dr. Flagg's "Soft Contouring Alloy." This formula, taught as experimental in 1884, was silver 68, tin 27, gold 4, zinc 1. After two years' experiments this formula was changed by Dr. Flagg in 1886 to silver 69, tin 26, gold 4, zinc 1. This in turn, after further experiments, in 1888 was changed to silver 70, tin 26, gold 3, zinc 1, which, after five years' clinical trial, was taught at the Philadelphia Dental College in 1893, three years before Dr. Black's experiments. We owe to Dr. Black a knowledge of the cause of the "ageing" of alloys that is most valuable, but he has yet to give us an alloy that is of practical every-day use. Why is it, I ask, that the progressive manufacturers of the country have not long ere this supplied the profession with an alloy after Dr. Black's formula, if it were otherwise?

Instead of the alloy containing gold we are furnished with one by Dr. Crouse, said to be the results of Dr. Black's conclusions, containing copper. The editor has sought to deny this formula as shown by Dr. Flagg, but one made by Fox & Carhart agrees with it in all essential particulars. No doubt further analysis of this alloy will be made in the future. As a matter of interest it may be well to mention that a sample of Dr. Black's alloy forwarded to Dr. C. H. Nicholson, of this city, and by him furnished the several members of the Rochester Dental Society, showed under the microscope decided shrinkage.

It has been claimed by Dr. Crouse and the other satellites of Dr. Black that he was the first to use the micrometer tests for alloys. This is not so, as shown by the editor of the *Western Dental Journal* in an editorial contained in the March issue. I quote:

> "Now in regard to micrometer tests. It has been claimed that such tests were not made until recently. We have claimed that they were made over twenty years ago, and a portion of the proof of the statement is found on page 386 of the *British Journal of Dental Science* for 1875, in a paper by the late Thomas Barnes Hitchcock, of Harvard, upon 'Physical Properties of Dental Amalgams.' We quote as follows:
>
> "'Besides the tube test, a micrometer was devised to measure leakage or expansion. A V-shaped trough exactly one inch in length, open at the top, in which the amalgam was packed. Against the end of the plug the short arm of a lever was pressed by a spring, while the long arm traveled over a scale made to measure the 1-1000 of an inch. Everything was done with the utmost fairness, the tests being made by members, so that no one had any advantage over another from any prejudice which might exist in the minds of the experimenter.' Then follow tests by the micrometer of the following amalgams: Arrington's, Diamond, Hood's, Johnson & Lund's, Lawrence's, Moffit's, Precipitated Silver, Townsend's, Townsend's Improved, Walker's.
>
> "Additional testimony as to micrometer tests is found on page 407 of the same volume.
>
> "If those who have been recently and are still engaged in amalgam experiments in America would look up these early records made by Drs. Fletcher, Kirby, and others in England, and Drs. Hitchcock and Bogue in America, it seems to us that much that is futile and much that is repetition might be eliminated from the discussion."

We have known for years that the alloys furnished us were open to improvement, but it behooves us to make haste slowly in adopting teachings that are opposed to all clinical experience, notwithstanding the effort of a chosen few to make gospel the acceptance of the conclusion reached.

Dr. J. H. BEEBEE said that no amalgam can be made with over forty per cent. of silver that will not shrink. He had had experience while with Dr. Holmes manufacturing his old-style "star" amalgam. This had about sixty per cent. of silver, and a little platinum and gold. They tested this formula and many others exhaustively, and assured themselves that any alloy containing a large percentage of silver would set quickly and was sure to shrink.

Dr. W. A. WHITE, of Phelps, thought there was an appearance of some jealousy between Drs. Flagg and Black, and it was probably all on the side of Dr. Flagg. Dr. Black has given us in his writings the result of years of close labor, and they merit very careful study by the profession. He is an exceedingly careful and conscientious observer. I worked with him at the meeting of the State Society in testing amalgams, filling disks and examining them, following and recording the observations he made on them. When the disks were filled with amalgam made by Dr. Black he refused to have anything to do with making or recording the tests, and yet no one of them showed shrinkage.

Dr. BEEBEE said he had taken a sample of Black's alloy and put it through the identical test used at that meeting, and that for him it did show shrinkage.

Dr. WHITE said that the alloy Dr. Beebee has tested was not made by Dr. Black, but was made by Messrs. Fox & Carhart and sold as made by Dr. Black's formula.

Dr. C. H. NICHOLSON, Rochester, said that the alloy which he had furnished to Dr. Beebee and others for trial he received from Fox & Carhart. He first wrote Dr. Crouse for samples of alloy made after Black's formula. Dr. Crouse wrote that he had made several batches and they had proved unsatisfactory, but that he had not made his Fellowship alloy after this formula. He then wrote Fox & Carhart to make some alloy after Black's formula, which they did, and this was what he distributed to Dr. Beebee and others for testing. Fox & Carhart assured him that the alloy was made from Dr. Black's formula, and that analysis returned the same ingredients in their original proportions.

Dr. B. S. HERT thought that possibly Messrs. Fox & Carhart might find it to their interest to furnish an alloy that would not work satisfactorily. They are selling amalgams of their own manufacture, and might not care to introduce a competing article.

### SECOND DAY—*Morning Session.*

The session was opened at 9.30, and after the transaction of routine business Dr. FREDERICK MESSERSCHMITT, Rochester, read the following paper:

## SEVERAL CASES OF CORRECTED IRREGULARITIES OF THE TEETH, WITH MODELS AND APPLIANCES.

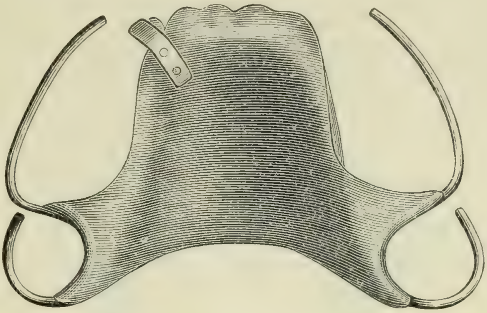
In presenting this paper, it is not my intention to enter into the subject of the etiology of irregularities of the teeth, or to describe the various methods devised for correcting them, but to present in a brief manner several cases, with models and appliances.

*Case 1.*—Georgiana G., age thirteen. Commenced treatment March 20, 1897. Completed May 10, 1897. The upper cuspids were located outside of the proper line of the arch, and the right lateral inside of it. I found the first molars badly decayed, and decided on their extraction. A vulcanite plate was fitted to the roof of the mouth, having German silver wire springs, No. 16 gauge (Brown & Sharpe), vulcanized into the plate, passing out through the spaces made by the removal of the molars and following around from each side of the buccal surfaces of the bicuspids, ending on the mesial surfaces of the cuspids.

The appliance was held in position by clasps made from No. 18 German silver wire, fitting the second molars as seen in Fig. 1.

A strip of No. 24 German silver plate, shaped to fit the palatal and mesial surfaces of the right lateral, was riveted on the plate. Force was applied by bending the free ends of the spring wires, after the plate had been cut away on either side, so as to allow the teeth to be drawn back into place. The lateral was moved at the same time by bending the metal so as to press on the mesial side, until it was by the central, and then outward into place,—the lower left temporary cuspid was ground away on its labial surface, so as to admit the upper cuspid to be drawn into line. The teeth were retained by means of a vulcanite plate, constructed in a similar manner, without the strip of metal resting against the lateral.

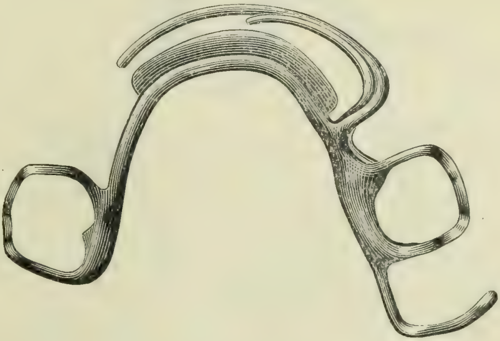
FIG. 1.



The following cases were corrected by means of Dr. V. H. Jackson's crib system:

*Case 2.*—Grace G., age twenty-six. Commenced treatment February 1, 1897. Completed May 6, 1897. The upper incisors were very much crowded and the outer cusp of the upper left first bicuspid was broken off. After studying the models I decided on extracting the remaining portion of the bicuspid.

FIG. 2.



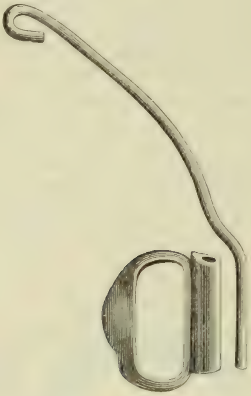
A gold appliance was made (Fig. 2), constructed as follows: Partial clasps of 36 gauge gold plate were formed to the palatal side of the upper first right molar, and the second bicuspid and first molar on the left. Cribs of gold spring wire, No. 21 gauge, were shaped to pass across the buccal side of the first molar, on either side, with the ends bent to extend over the arch at the junction with the adjoining teeth, and made to rest on the partial clasps, the effect of which was to clasp the molars for anchorage. An additional gold spring wire, No. 19 gauge, was bent to pass back of the second molar on the left side to increase the anchorage. A base wire, No. 14 in size, was formed to the palatal side of the teeth, following close to the gum, slightly back of the teeth to be moved. A piece of gold plate, about 26 gauge, was cut to fit the curve of the palatal side of the incisors and pass under base wire. Two gold springs, Nos. 16 and 19 gauge, were formed to extend through the space made by the removal of the tooth, passing close to the mesial side of the second bicuspid and bent to extend forward, No. 19 ending in a curve on the mesial side of cuspid, and No. 16 on the mesial side of right incisor. The various parts of the appliance were placed in position on the model, united with hard wax, removed, invested, and soldered with 18k. solder.

The cuspid was well started before force was applied to the incisors, finding that the right central incisor was hard to rotate.

I cemented a gold and platinum collar, No. 35 gauge, to the tooth, having a tube soldered on the labial side (Fig. 3). A gold spring wire, 18 gauge, having a slight hook on one end, was passed into the tube, sprung back, and ligated to the crib on the right molar. The tooth was rotated by removing wire and straightening the end of it every few days.

The teeth were retained by cementing a collar on the right central with a bar resting on the palatal side of the right lateral. The upper left second bicuspid was moved slightly forward, to equalize the remaining space, by the use of hickory wedges, and retained by cementing a collar to it, having a lug soldered on the distal side, to rest against the first molar.

FIG. 3.



*Case 3.*—William M., age fifteen. Commenced treatment of the upper teeth January 11, 1898. Completed February 17, 1898. Commenced treatment of the lowers March 3, 1898. Correction incomplete. This case shows a deformity frequently met with in our practice, that of protrusion of the upper incisors, with spaces between the teeth, and a flattened condition of the lower ones, leaving a large space between the two when the jaws are closed. In this case the lower incisors were very much introverted, caused partly by the loss of the right first bicuspid.

A German silver appliance, as illustrated in Fig. 4, was used to draw the upper teeth back until spaces were closed. Partial clasps of tinned German silver were fitted to the bicuspids and the first molars on either side, with cribs passing over the first molars for anchorage.

A German silver wire, No. 19, was bent to pass back of the second molars on either side, to increase the anchorage.

A base wire, No. 14 in size, was bent to follow accurately the contour of the palatal arch from side to side, passing across the arch at about the line of the mesial surface of the first molars. The ends of the base wire were bent at nearly right angles, so as to rest on the partial clasps.

A spring wire, No. 17 in size, was bent to cross the labial surfaces of the incisors, forming a small loop on either side over the cuspids and passing through in front of the first bicuspids on either side, as near the grinding-surface as the articulation would admit, with the free ends resting on the partial clasps. The various parts of the appliance were held in position on the model, and soldered with chemically pure tin by means of the soldering iron.

The spring wire was flattened by the use of a pair of flat-nose pliers so as to rest on the prominent teeth, and as they moved backward the excess wire was taken up by closing the loops.

The lower incisors and cuspids were moved forward with a German silver appliance, as illustrated in Fig. 5.

Partial clasps were fitted to the second bicuspids and the first and second molars on either side, with cribs passing over the first molars for anchorage.

FIG. 4.

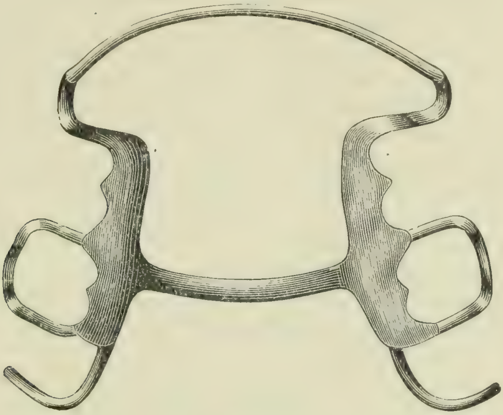
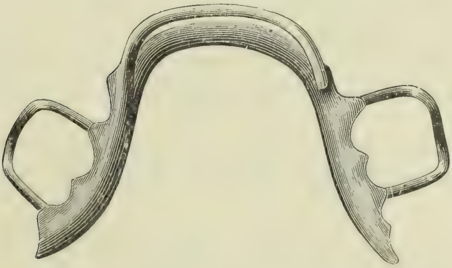


FIG. 5.



A base wire, No. 14 in size, was formed to the contour of the gum line, following the lingual side of the teeth, from one side of the arch to the other, with ends resting on the partial clasps.

Two spring wires, No. 16 in size, were formed to extend forward from either side of the arch, following the contour of the teeth and crossing one another at the median line.

The appliance was soldered with chemically pure tin on the model by means of the soldering iron. Gold and platinum collars having lugs on the lingual surfaces were cemented to the incisors and cuspids to hold the springs in position.

Although the case is incomplete, I thought it sufficiently far advanced to present at this time. By examining the models you will see how far the teeth have been moved, and looking at the models of the face will show the improvement in the facial contour up to date.

### *Discussion.*

Dr. R. H. Hofheinz had nothing to say in criticism of Dr. Messerschmitt's methods. Regulating the teeth is a specialty of itself, and successful practice of the specialty needs special knowledge and skill. It is appalling to see the condition of patients because of the neglect or wrong treatment by the dentists. How many first permanent molars are removed that should have been retained at any reasonable expense of time and work. They are most valuable for securing the other teeth in position.

The method of correcting irregularities practiced by Dr. Jackson is most valuable, but no system will answer for all cases, and the practitioner must adapt means to the condition found.

Dr. C. H. Nicholson asked Dr. Messerschmitt how long it would be necessary to keep the retaining device in position.

Dr. Messerschmitt said he could not answer that question, but would keep it in use till he felt reasonably sure that the teeth would stay where put. It is necessary also to keep an eye upon the case all the time to see that the bands are well cemented, as the teeth are liable to become decayed under the bands if the cement washes out. In this case the retaining device has been worn since last May, and will probably be worn two or three years.

In rotating teeth it is well to rotate them just a little beyond the point desired, as they are nearly sure to return in some degree toward their original positions.

He spoke of one case in which the patient had worn a retainer constantly for about six months, and at night afterward for a much longer time, and thought it well to have it put on occasionally after it was laid aside, and if it was found to bind on the teeth to resume its use for awhile.

Dr. Nicholson asked Dr. Messerschmitt if he had ever arranged a fixed set of bands for wear on the anterior teeth during the night.

Dr. Messerschmitt said that he had not, and he thought it would be better to provide a plate, as the bands would be difficult to get on.

Dr. J. H. Beebee spoke of an unsuccessful attempt he made some years ago to correct the position of a lateral incisor which extended at nearly a right angle from its proper position. He connected the incisor with the first molar by a rubber band, but failed to move the incisor.

The discussion closed, and the following paper was read by Dr. I. C. Edington, of Rochester:

### Some Thoughts for the Dentist.

The preparation of papers to be read at dental societies is much like the preparation of sermons by the preacher. We have the same old subject, the same sources of information, and yet we have different points of vantage from which we may gain different views of some phases of our work. An interchange of these views gives those who participate a keener insight into and a greater appreciation for the apparently trivial things, which, as Michael

Angelo said, "make perfection," but added with peculiar emphasis, "perfection is no trifle." All cannot be Millers, Blacks, Gorgases, Kirks, etc., but as the little grain or atom has its uses and is essential to the completeness of that of which it forms a part, so we may fill a necessary place, though in a humble sphere. Then, too, in following the lead of these great minds in soaring among the stars, micro-organisms, amalgams, etc., we are apt to lose sight of the minor considerations, which are as important as these more abstruse problems.

One point of importance to a man intending to follow the profession of dentistry is that he may recognize the different phases of human nature, bearing in mind that, as a rule, the weaker side is presented to him in the dental office. Being able to distinguish and comprehend the different temperamental peculiarities will enable him to better accomplish the work which he is to undertake. Some patients require a certain amount of sympathy in voice and manner; others, firmness, decision, positiveness. While being sympathetic, it is possible to be firm. We may also be firm, and yet kind.

The office should be neat, well appointed, light and airy, free from the display of instruments and machinery so far as possible, and free from the odors of the medicine case and cuspidors. The instruments, hands, and linen should be clean and the breath sweet. There should be an air of knowledge and familiarity regarding the case in hand. All these tend to inspire the patient with confidence in the operator, and there is nothing which conveys a better impression to a patient than the fact that the dentist to whom he has surrendered himself for treatment shows by his actions that he is competent. And that competence is proved, not so much by what we *say* as by what we *do.*

After the diagnosis, as little reference as possible should be made to the work in hand; but rather the conversation should be upon some topic foreign to the subject and which is mutually interesting. The dentist must, therefore, know some things besides the way to extract and fill teeth. In other words, he must be "up-to-date" in general knowledge.

One phase of dentistry which will appeal to some of us is the matter of fees. To settle upon a uniform schedule of prices is not easy and is perhaps impossible. Our fee for filling certainly cannot be based upon a fiat rate. It would be unfair to assume that we can properly prepare and fill all cavities in the same amount of time, regardless of their accessibility. We therefore cannot say that we will fill a cavity the size of a wheat kernel with gold for three dollars in all cases, since in one case it might take twenty minutes to half an hour, in another two or three hours. The same may be said of amalgam and cement. It therefore seems unwise to say that we will fill cavities of a certain size for so much, regardless of position. The questions of patients have aroused these thoughts in my mind; and as to the fee, it occurs to me that we should make it according to the service rendered,—namely, the salvation of tooth-structure and the restoration of the dental organs to usefulness. The dentist *should* be the best judge of the material to be used to accomplish the desired end. As to the fee for extraction, it is a deplorable fact that the prevailing price in Rochester is but twenty-five cents.

One of the most important duties the dentist owes patients after mechanically putting the mouth in proper condition is to advise them as to the care of the same. He should instruct them in the use of floss silk and toothpicks, the proper use of the brush, dentifrice, etc., and above all, the proper *time* for cleansing the teeth, suggesting any other prophylactic treatment that the case may require. Dental work may be beautifully accomplished, but without the proper care will be of limited service. Teeth should be examined regularly, and a suggestion to that effect would not be out of place.

This advice and these suggestions, necessarily requiring some detail, therefore time, and being of benefit to the patient, should be rewarded by something more substantial than "thank you." While speaking of fees, I do not count it out of the way to present the bill immediately. I cannot see why a dental bill should not be paid as promptly as any other.

Boiling water, with a little bicarbonate of soda added, strikes me as being one of the most efficient sterilizers for instruments.

Much has been said in regard to artificial teeth, and I think many dentists talk too much about it to patients. I am aware that most of us want to please patients, asking their advice as to how they wish their plates made, kind of teeth they want used, etc. Some may ask the advice, and then do as they think best. But I fear, judging from the appearance of some artificial teeth, that many follow the advice given by the patient as to the selection and the arrangement on the plate.

On taking impressions and making artificial teeth it seems to me well to avoid conversation on that subject; but whatever conversation is carried on should (to repeat what has already been said) be foreign to the subject.

The dentist should be the judge of the impression material used and the proper method to be employed for taking that particular impression. This knowledge can be gained by a close examination of the buccal cavity. After the model is made, one good way is to make a wax bite-plate to represent the finished plate as to length of teeth, build of the mouth, adding wax here or there or cutting it away as the case may indicate, until we have the facial expression which we desire. This, to me, is one of the simplest, surest, and most satisfactory ways of getting the bite. In case of a full upper and lower, I secure them in proper relationship by means of staples.

It is probably well known that the tendency to throw the lower jaw forward when biting into anything is perfectly natural. Hence, when we have *nothing* to bite into, the tendency is to close the jaw right. I never say to a patient, "Close the jaw naturally" or in any other way, simply "Close the mouth." In the bite of the plates passed around, the surfaces being flat, the mouth would close naturally without any suggestion. The lower jaw is about as perverse as a titman pig; hence if we ask the patient to bite naturally, or this, that, or the other way, he is sure to bite in the opposite direction. When I wish to take the bite I simply say, "I want to take the bite." If I cannot think of anything to talk about, I whistle.

After the bite-plate is in place and the mouth closed, I ask, "Where do you strike it most?" If some point is indicated, I either cut off or build up as the case may require. When I am told that they strike evenly all around, I think I have it nearly right. I then proceed to mark with an instrument the median line and also the line of the lips. Then I secure them in the manner indicated by the models. Removing them from the mouth, I place the model into the bite-plates and mount them in the articulator.

I usually decide on the shade of tooth to be used without the assistance of the patient, then he is dismissed until the plates are completed. This gives me an opportunity to arrange the teeth upon the plate as I may see fit. This may seem arbitrary, but I assure you that it is some advantage to please one person even though that one should happen to be the writer.

Instead of destroying the wax bite, use a little more wax for mounting the teeth, that you may have the original as a model to finish the plate by.

In closing this paper may I be permitted to suppose a case:

A patient presents herself for treatment. The diagnosis shows that she has a very tender, somewhat elongated third molar. The following information is vouchsafed: "Ah! yes, I see! Your case is serious. The pericemental membrane of the right superior dens sapientia is highly inflamed. Your case is further complicated by a hyperesthesis of the pulp, due to the engorgement of the blood-vessels. It will require our most strenuous efforts to reduce the inflammation of the contiguous parts, and the congestion within the tooth-chamber can best be controlled by devitalizing the pulp. It will be necessary to prescribe a systemic treatment in the shape of a powder containing antiphlogistic properties."

"Oh, doctor," the patient exclaims, "what *is* the matter? What do you mean by hyper—something of the pulp?"

"Ah," is the reply, "you refer to hyperesthesia. It is excessive sensibility as a result of a phlogistic condition."

There was a mute appeal on the patient's part. The doctor was unquestionably making an impression upon her, but she finally was able to ask with quivering lips as to what he meant by phlogistic, and scarcely had she begun to utter the word when this flower of our profession caught it from her lips.

"Phlogistic, madam, is an adjective derived from the noun phlogosis, which means inflammation;" and the doctor picked up an instrument to proceed to business, but his patient, holding up her hands in protest, exclaims, "No! no! My tooth is so sore that I can't think of having it touched to-day; perhaps I'll come again," and as he graciously bows her out of the office door he thinks of the fickleness of women in general and of dental patients in particular, and, going to his desk, immediately begins an article for his dental journal.

Why this exhibition of pedantry? Why are mole-hills magnified into mountains? Why do we mystify and frighten patients, and thus unstring the nerves already overwrought, thereby endangering a successful operation? I maintain that the airing of our technical knowledge, and the use of technical language, is entirely out of place. What does the average person know about the different surfaces of the teeth, as we know them,—posterior, anterior, approximal, distal, mesial, lingual, buccal, labial, etc.? If we have any explanation to make, we should talk United States.

Dr. FRANK FRENCH, Rochester, said it was not his intention to enter into a very extended discussion of this paper, but rather to break the ice for others. The paper, while not devoted to any one subject, is valuable in treating a number of minor events which make the dentist's daily routine, for his own as well as for his fellows' consideration. This paper opens a wide field for the mention and discussion of methods which, while familiar to the individual, may be new and useful to others, so that, with this opening provided, he trusted that members would not hesitate to give the society their own views on the points mentioned, as well as others in the same line, that all may be benefited. As to the discussion of papers, not this one in particular, but in general, are we not often too much afraid of giving offense to the writer to make an honest criticism, not as to his style, his English, or composition, but as to his ideas and methods as put forth in his paper? No better opportunities for mental discipline present themselves than can be found in a frank and open discussion of the papers given at our meetings, and surely when presenting a paper we are not so narrow-minded as to take offense at a candid expression of opinion, even if it is adverse and opposed to our views. Of course any remarks which would have the slightest personal bearing would be improper, but he was happily of the opinion that in the minds of the members of this society such thoughts are too foreign to demand the slightest consideration. The average newspaper reporter, regardless of the facts of the case, causes all brides to look charming in a creation of cream or white silk, with pearls and orange-blossoms, unblushingly naming them all as "society's fairest daughters," and sends the happy couple off on a trip accompanied by the best wishes of hosts of fashionable friends. Are we not too much like them in the habit of indulging in empty compliments to the writers of our papers, when the expression, if felt, of an honest criticism would be of immensely greater benefit to the essayist and everyone else?

He hoped his friend Dr. Edington would not conclude that he was going to tear him in pieces by the foregoing. He would remind him of his opening statement, and that he did not at this time expect to set the pace in this direction, but to take occasion to state that the practice referred to has become noticeable to himself, and he had no doubt to others as well.

The first point in this paper, referring to "temperamental peculiarities," offered a great temptation to depart from his original intention, as the memory of the labor involved in the preparation of a recent effusion on "Temperament," presented to the Rochester Dental Society, is still green.

The points on cleanliness of person, instruments, etc., are well taken and cannot be too strongly emphasized. Much as we hear and read on this subject, he thought there was still room for improvement. He did not believe a suitable apparatus for disinfecting dental instruments had as yet been produced, and considered this a good field for some ingenious individual to experiment in. The doctor's method of taking a bite is a good one, and if you have never tried wax bite-plates you will find them lighter and more desirable than the metal ones furnished by our depots.

He considered the advice given as to the general neat and cleanly appearance of the office and operating room timely and good. It is astonishing how observing some people are not only of the appearance of yourself and office, but the manner in which you receive them in performing your duties. Too much conversation with patients, whether the speaker indulges in technicalities, or what the essayist is pleased to term "United States" talk, is frequently calculated to depreciate you in the estimation of your patients, who regard a dignified silence as being preferable to a Gatling gun discharge of talk to one whose social relationship would under other circumstances perhaps not afford the opportunity,—especially while at the chair. Many unpleasant conditions attend our operations which should not be overlooked.

Professional life affords a most congenial environment for the most refined tastes and polished manners, and dentistry in any of its phases offers to none of its adherents humiliation to the keenest sensibilities of a gentleman.

He spoke of amalgam as working differently in different mouths, and it seemed to him natural that it should do so, as the secretions in the mouth are of different characters. It is so with steam boilers; they get filled with scale, and the solution which dissolves the scale works differently according to the analysis of the water used in the boiler.

There was no further discussion, and Dr. H. N. HOLMES, Canandaigua, read the following paper:

## EXPRESSION IN CROWN- AND BRIDGE-WORK.

It is perhaps because I entered upon my professional career as a student at about the time of the advent of the extensive use of the artificial tooth-crown, aside from the old-fashioned pivot tooth, and the evolution of the single gold cap into that much used and very much abused system known as "bridge-work," that I have been throughout my practice an interested observer of the physiological, artistic, and pathological results obtained from the now common use of this device in its various forms.

It is within the memory of most of us when the artificial gold crown was either unknown or so little used as to be a curiosity, but it is a curiosity no longer. They are with us and about us everywhere; the high and the low, mistress and maid; the rich have them, and the poor cannot afford to be without them. The wide range in prices charged makes this possible, and, if I am rightly informed, there are two gold-crown factories in this city, running on full time, to supply dentists who are too busy to make their own. So that the gold crown is probably disfiguring more mouths than all the other devices of modern dentistry combined.

Yet with all its abuses the gold crown, within the scope of any dentist of ordinary ability to make, in its proper place, singly or in combination as in bridge-work, is one of the most useful, if not the most useful, single device we have. Its abuse will in time work out its salvation, and I predict a much more conservative use of the gold crown in the future; and the class of operators who make a practice of placing them on teeth that would be much better filled will have to seek another department, for the time has about come when to see a mouth full of gold teeth, except in some special cases, instead of suggesting skill, merely recognizes the display of some cheap and inefficient dentist.

But it is no longer considered necessary to sacrifice healthy roots and teeth too frail in structure to admit of successful restoration by filling, and the artificial tooth-crown, in its various forms, has brought this about.

It is unnecessary to dwell upon the requirements for crowning. To the conservative and strictly professional operator there are only two conditions met with that make a crown a necessity: these are where skillful filling will not avail, and for attachment in combination work. But in this paper I shall deal only with the single crowns most used at present: the gold cap-crown and all-porcelain crown with metal post, and the combination of gold cap, metal post, and porcelain front. All three have their places,—for the molars and lower bicuspids the gold cap finds its legitimate use and is supreme and enduring. There may occasionally be an excuse for placing it farther front, but, generally speaking, it never should be. Of the other varieties for anterior teeth, the condition of the root and adjacent tissues should determine which is to be used, though in this I find a wide difference of opinion.

A few weeks ago I asked one of our oldest and best known members what he thought of the all-porcelain crown, naming the Logan. He said he had never used but three or four; he didn't know exactly why, but has always regarded it as a cheap substitute for the Richmond.

I held that same opinion at one time, but experience and observation have changed my ideas somewhat, and I would like to compare these two systems on their merits. Assuming that the circumference of the root at the margin of the gum is intact, from several standpoints,—the mechanical, artistic, hygienic,—that of adaptability in occlusion, strength of attachment, and permanency, considered mechanically, the advantage is with the Logan, being less complex and much less liable to breakage than are the facings on the cap and pin-crown. Artistically the Logan also has the advantage, as it is connected with the root by a flush joint just beneath the free margin of the gum, and being more easy to conform to the pitch and bevel of the adjoining teeth in the line of the arch. It has a much more natural appearance, and does not have that opaque look which all teeth with metal backings have to a degree. In adaptability for antagonizing the opposing teeth the Logan scores another point, for with ordinary skill it can be ground to occlude in exactly the same way as the natural teeth, and but few operators get an opposition worthy of being called articulation with the Richmond, as a flat surface or inclined plane is an opposition, but not an articulation.

Regarding strength of attachment, the form of attachment in the Logan is a metal post of platinum and iridium, giving a somewhat flexible but not ductile alloy, T-shape, giving greatest strength from before back, where most needed. Roots should be prepared and crown attached and articulated in such a manner that force of natural opposition will fall on the line of the axis of the root. Force from within or without or laterally does not tend to fracture the root, but only to draw the post from the root as in drawing a nail with the claw of a hammer, and I do not see the advantage of the so-called cap to prevent breakage.

The form of attachment should be positive,—a notched post and grooved root.

While the Richmond relies for attachment on cap and post, the cap is an aid in attachment, but width of band must be compensated for by corresponding reduction in the size and length of post. Therefore, if not to interfere with the efficiency of the post, it is in reality a mere washer, and is in consequence superfluous and useless so far as affording additional strength of attachment under the conditions I have named.

As in the Richmond, I hold that no cap can be made, in the majority of cases, with band of sufficient width to furnish strength, and not be unsightly, that does not menace the already pulpless tooth at the most vulnerable point of its remaining source of vitality—the gingival margin of the gum—by mechanical irritation and often retention of food and secretions beneath its margins, causing a stoppage of circulation and consequent congestion at some point or points of the circumference of the root, which, sooner or later, according to the tone of the system and physiological resistance met, results in degeneration of the tissue impinged upon, and absorption of the bony septum between the teeth, and, lastly, a phagedenic condition of the entire socket and eventual loss of the tooth. While in many cases these last conditions do not take place during the lifetime of the patient, it does not disprove but that it has always the tendency, to a degree, and through no fault of the operator. In the crown without the band, these conditions, if the adjustment is proper, are not invited. Regarding permanency, the crown is the most permanent which furnishes the least irritation to the tissues surrounding the root, and I think that is, without question, the bandless crown.

The possibility of decay of the root has been urged against bandless crowns; but when we consider that in nine out of ten teeth that are subjects for single crowns no pathological condition of surrounding tissue exists (and that a root will not decay beneath healthy tissue), I hold that the crown which promotes and assists physiological function is preferable to one which, in the majority of cases, insures a pathological state at the outset.

In conclusion, I will frankly say that as a result of my practical experience and observation I consider the Logan crown superior to the Richmond, except in cases where the root is too frail to attempt its attachment; that instead of being a cheap substitute for the Richmond, it is mechanically, hygienically, and artistically its superior, and when properly done calls for a higher degree of operative skill, and is worth every dollar as much to both patient and operator. I am convinced that its chief fault lies in the fact that its attachment being more operative than mechanical,—like the alloy filling,—it is too easily done in an indifferent manner.

There was no discussion of Dr. Holmes's paper, and the society adjourned.

## AMERICAN MEDICAL ASSOCIATION—SECTION ON STOMATOLOGY.

(Continued from page 865.)

### SECOND DAY—*Afternoon Session* (Continued).

DR. A. E. BALDWIN, of Chicago, read the following paper:

### SOME FACIAL DEFORMITIES AND THEIR PREVENTION.

Some may think the presentation of this subject from this standpoint is emphasizing the importance of trivial things, but I am sure that a few minutes spent in considering this subject will be minutes well spent for the integrity and symmetry in the development of the lower part of the face of those intrusted to our care and keeping, and over whom our watch care should always be extended, and I hope that the somewhat terse presentation of the subject may be supplemented by a free, generous, and critical discussion, which is of even greater importance oftentimes than the paper itself.

Having been a close observer of the human face for more than a score of years, I feel that should I properly present the subject to you, humanity at large may be much benefited in several ways.

In the first place it is proper to say that we seldom see a perfectly developed human frame, or a frame even entirely free from deformity, and this truth is even more true of the face than of almost any other part of the frame. I have for years had a good opportunity to observe the mouth and jaws, and to some it may come as a surprise that is is a very rare thing to find a person the two sides of whose jaws (either upper or lower) are alike. We all know that in the growth or development of the child into the adult the head as a whole grows much less than the body or extremities, but the growth of the jaw in the normal person is very great even at the age of two or three years, and with the full complement of twenty deciduous or milk teeth, the jaws are abnormally small for the proper contour of the bony outlines of the face. But this lack of contour is not noticeable, for the face of the little child is by the deposit of soft tissues kept in the "dumpling" shape, but as the child approaches adult life and nature enlarges the jaw the soft tissue is resorbed and the bony outline appears more distinctly, either normal or abnormal in size, making the perfect or deformed face as the case may be.

Now, a few words about the normal change from the deciduous set of twenty small teeth to the full adult set of thirty-two large teeth. You are all aware that at about the sixth year the jaw is surprised by the appearance (at the rear of each of the second deciduous molars) through the gums of the largest, strongest, and best-rooted teeth that are given to man,—these, as you know, are called the first permanent or "sixth-year" molars. Coming in as they do at the rear of the deciduous teeth, they act as "abutments" for the anterior arch in its development, as in the jaw between these two points must in a few years (four to seven) appear ten teeth of nearly double the size of the teeth to be replaced. Speaking in a very conservative way, at least three-fifths more space is needed for the regular eruption of these ten permanent teeth than was needed by the deciduous. These abutment teeth, so strongly and deeply set in the jaw, are so placed that they can hardly be moved back by any force applied, and it is evident that nature thus wisely provided that no infringement should be made upon the space to be developed in the rear of these teeth to be occupied by the second and third molars. So you see that to provide for the occupancy in the jaw of the permanent anterior teeth, the jaw must expand, and doubtless it has been a matter of common observation to you all that the newly-erupted permanent central incisors appear surprisingly large, as compared with the old, being formed to fit the face of years to come, and as a matter of course these teeth appear crowded, and are quite irregular, often overlapping or turned edgewise. Some notable exceptions are noticed in cases where, prior to the eruption of the permanent teeth, you may notice that the deciduous teeth, which previously were close together, now at the fourth, fifth, or sixth year are moving apart so that the spaces are noticeable and marked; this when it occurs is the result of the new wide teeth approaching the surface directly side by side, and they are already getting in their work of spreading the arch. In these cases of the teeth coming in overlapping or crooked you are often importuned by parents who call upon you to help their children to regular teeth by extracting the teeth on either side to allow them to come down "regularly," as they say, and but for the thoughtlessness or carelessness of many medical attendants indulging these importuning parents this paper would hardly have been written, for following the thought of the paper you will see that in the effort to relieve the child you have curbed the expansion of the jaw, by removing the cause. This expansion is most largely brought about by the expanding pressure of the incoming larger teeth. Perhaps right here is a good place to present to you a rule,—almost without an exception,—which is of the greatest importance to you in serving the best interests of your little patients. The rule is this: *Never extract or recommend the extraction of any deciduous tooth, save to make way for the permanent tooth which is to take its place.* For I am sure by closely adhering to this rule you will always utilize the forces of nature to produce the necessary expansion of the jaw to the natural conformity of the face.

To illustrate this further, and to further emphasize this rule, we will take a case of incoming permanent central incisors in this illustrative case. They are so crowded that they overlap very much, and the thoughtless physician, in his supposed kindness to the patient, has removed the deciduous laterals under the careless supposition that it was necessary. In this case the teeth will straighten very quickly, but instead of the expansion of the jaw, which would have taken place were the laterals left, the jaw will expand very little, if at all, so the deformity of the face will be marked when the teeth are all erupted.

While on this subject it will not be amiss to speak, if only incidentally, of the necessity of caring for and preserving the temporary molars, not only for the purpose of preserving the space for the incoming bicuspids or premolars by which they are replaced about the eleventh or twelfth year, but also for hygienic reasons, and notably among them may be mentioned the fact that the child up to the eruption of the bicuspids needs a perfect masticating apparatus, even more than the adult, for in the adult the masticatory apparatus need only be used enough to produce for the system pabulum enough to furnish nourishment to make up for the daily waste in the tissues, while in the child not only must the waste, which is greater than in the adult, be replaced, but also must there be nourishment furnished for the development or growth of all the organs of the expanding and rapidly growing physical frame.

Still another reason for bestowing much care on these teeth is that the child is forming habits for life, and if his teeth are neglected so as to become sore or painfully sensitive to mastication he will only masticate enough to enable him to swallow the bolus, thus so imperfectly divided, and in this way not only forming the habit (too prevalent with Americans, young and old) of "bolting" the food, but also, which is more serious, paving the way for all the ills, nervous and otherwise, that come from an overloaded and overworked stomach.

The writer does not want to claim that all of the deformities of the lower part of the face can thus be prevented, for he realizes that there are also the very powerful factors of inheritance which must be taken into account; but a proper heeding of these matters by the medical adviser will result in a great lessening of such deformities, and incidentally of improving the health and nourishment of the patient while young and reaching far into age as well.

Some may say it is improbable that such slight force as the incoming teeth may exert would produce such expansion as occurs in the bony expansion or development of the jaw. It is only necessary to say to such that in all nature it is seen that the feeble though constant force is much the most powerful source in changing from the normal to the abnormal. These illustrations in nature are on every hand, and are much easier understood than can be that of the elongation of the long bones of the leg, which lengthening occurs by deposit between the shaft and the articulating surfaces.

In the short time at the disposal of the writer it is impossible to go into anything but generalities, and his paper has subserved its purpose if it results in the medical profession guarding with much more care the temporary teeth of the little ones, as to the care to be bestowed upon them in keeping them healthy, and in seeing that they are retained until the new teeth which are to replace them ask for the position.

### *Discussion.*

Dr. E. W. Varley, Pueblo, regarded the subject treated by the paper as one of the most important and yet as being among the most neglected subjects that could be before a dental meeting. We are supposed to know what to do with these little ones when they come under our care, but unfortunately they usually come too late to receive the attention they should have. The subject has a most important bearing on the necessity of regular examinations of school-children's teeth. This should be obligatory in every school, and the only way is to get the people convinced of its importance; they will then work on the legislature and get the necessary laws passed. We frequently are told by parents that the importance of saving these early teeth has never been brought to their attention. We should convince them of its great importance, and have them bring the children to us regularly. Work done while it may be effective is good; when it is too late little can be done.

Dr. S. M. Townsend, Denver, said that the care of children's teeth has been the most interesting part of her practice, and by doing work for the children she acquires the confidence of the parents. Many of her little patients come to her as early as four years of age, some of them still younger. She had always believed that premature extraction of the deciduous teeth was likely to cause an overcrowded condition of the permanent teeth.

Dr. J. Taft, Cincinnati, was glad that a lady dentist had spoken. He thought that the care of the teeth of the very young should be largely in the hands of the lady dentists. They were especially adapted to get practice among the little ones, and their tender sympathies would enable them to win the confidence of the children. The care of temporary teeth is a subject worthy of very much more attention than is usually given it, either by dentists or by parents. It is often said that when temporary teeth are extracted the jaw contracts; this is not quite true, but it is true that when temporary teeth are prematurely extracted, or when they are not used as they should be, the proper growth of the jaws does not take place.

Mothers should therefore be taught that it is necessary to secure room for the permanent teeth; that the deciduous set must not only be preserved, but that it is necessary that they should have a reasonable amount of exercise in masticating food so hard as to bring some force to bear on the teeth and jaws in eating. The preservation and use of the temporary teeth are quite as necessary as is the care of the permanent teeth. Many dentists think that if nature does not remove the temporary tooth at the time the corresponding permanent tooth should make its appearance, the tooth should be removed. This is not good practice, unless the permanent tooth is in evidence. Sometimes it is necessary to remove the temporary tooth on account of caries and consequent toothache that cannot be endured or cured, but this occurs only when the teeth have not received the attention they should have. Cavities should be filled as carefully and with as much hope of benefit as in the permanent teeth. In conclusion, he advised all to endeavor to get bigger jaws, to better accommodate the permanent teeth by teaching the necessity of harder use of the temporary set.

Dr. J. H. PARSONS, Boulder, Col., asked for the proper treatment of deciduous teeth with dead pulps.

Dr. HALL said his custom was to treat the tooth and fill it, but not to fill the root-canals, because it seemed to him that it would be difficult for the permanent tooth to absorb the root if it was filled. He advises patients to have such teeth treated repeatedly if necessary, but not to either have the root-canals filled or the tooth extracted.

Dr. BALDWIN said that the moment the pulp is destroyed in a temporary tooth absorption ceases, and the root-canals of such teeth coming into his practice are filled, and he thinks properly.

Dr. J. TAFT read the following paper:

## MANAGEMENT OF PULPLESS TEETH.

Two thoughts induce me to present the following suggestions upon the subject indicated by the above title,—namely, first, that pulpless teeth and roots are susceptible of being retained in the mouth and made serviceable and comfortable under a proper treatment, for a much longer period than is usually realized in the mode of treatment adopted.

Secondly, faulty management is so very common that it would seem important that some effort ought to be made for a better mode of procedure in this particular of practice. It is entirely familiar to all dentists of much observation and discrimination that by far the larger share of disease and discomfort from affected teeth occurs where the pulps have been destroyed (usually the result of decay). Disease and severe pain many a time occur before devitalization of the tooth-pulp, and without some appropriate treatment the teeth are disintegrated and destroyed.

Physiologically, teeth-pulps were intended to serve a valuable purpose during the life of the organs with which they are associated. There is an important function which they should serve during this period, but unfortunately from one cause or another there are multitudes upon multitudes of pulpless teeth and roots. The common occasion of death of this tissue is by decay of the teeth. Subjecting the pulp to exposure, irritation, inflammation, hypertrophy, suppuration, and death, these are the common result of this process.

Pulps are, however, frequently devitalized in other ways. Calcific deposit in the pulp-chamber or in the pulp itself or upon the apex of the root, cutting off its vascular and nerve-supply, is not an infrequent cause of pulpless teeth. In a low state of health, when the nutrient function is impaired, the pulp sometimes becomes devitalized without any apparent cause. The conservation of exposed tooth-pulp is a mode of practice that under favorable circumstances and with proper skill is entirely practicable. The indications presented in many cases are not such as to promise much good for conservative effort, and hence it occurs that many times the destruction of the pulp becomes a necessity if the best results are to be attained. The best method of accomplishing this is not always employed. Many methods have been used, which we will not fully consider here. It is hardly proper to pass from these points, however, without two or three suggestions. One is, that when an exposed tooth-pulp is to be devitalized and removed its conditions should be as thoroughly understood as possible, and not only this but the peculiarities whether normal or abnormal should be well understood. The practice of applying poisonous escharotics, as arsenious acid for example, should always be avoided. With the appliances and facilities at the command of every dentist the use of such agents is wholly unnecessary, and especially so when it is considered that most serious results follow their use in some instances, in either the immediate or remote future, and especially in the case of those highly susceptible to the poisonous influence of arsenious acid or similar agents. Specific results in some instances occur within twenty-four hours; these results, however, may in other cases be delayed for weeks or months before manifesting any action in a very marked manner.

It is better that these agents never be used for this purpose, and that some methods should be employed that would not leave a sting behind. Since cocain has been used as an anesthetic, there has been no occasion for using a more violent agent, as by proper application to or injection of the agent into the pulp it may be so anesthetized that its painless removal is an operation entirely practicable. Since the general introduction of anesthesia by cocain and the electric current (cataphoresis), it is a very simple operation to render an exposed pulp entirely oblivious to contact, when it can as easily be removed from its habitat as any other tissue of the body.

This can be done by the use of the barbed broach or a sharp pulp-extractor. In the performance of this operation the teeth should be perfectly protected by the rubber-dam from the saliva or any agent that would convey infection. The instruments employed in the operation should be absolutely aseptic, and kept as nearly so as possible during the operation. The broaches, if they are used, should be moistened during the operation with some efficient antiseptic fluid. The instruments used in cleaning out the canal should be used with the same precaution. The pulp-chamber and canal that has been treated in this manner is in the best possible condition for permanent inclosure, unless there is a persistent hemorrhage or weeping of the plasma from the foramen into the canal, and that in most cases is readily arrested by some appropriate styptic or coagulant, as Lugol's solution, tannin, persulfate of iron, and a number of other things that will suggest themselves to the intelligent dentist.

In by far the larger portion of cases this flow will cease spontaneously in a very brief time, but if not it may be assisted as indicated.

When the pulp has been brought to this condition and the canal thoroughly dried by a jet of warm air or by the use of a copper root-drier, it is in the best possible condition for permanent closure. In such cases nothing can be gained by the very common prolonged treatment preparatory to filling. The best time for closing such cases is immediately. If there is a doubt as to the entire arrest of the plasma flow through the root, it may have packed into the canal a small pledget of lint, moistened with some astringent; then fill the canal with Hill's stopping or some material that will be impervious. Twenty-four hours will be sufficient to determine whether the flow has been entirely arrested; before removing the temporary stopping the rubber-dam should again be applied, when it will be determined whether there remains any discharge; if not, the cavity may be wiped with lint, moistened with a solution of salicylic acid, when the canal and pulp-chamber should at once be thoroughly filled with a material that will wholly exclude moisture in any form. Care should be exercised in filling the extreme part of the canal where there is no disease in the apical space.

Any treatment after the canal and pulp-chamber have been brought into the condition above described is liable to be fraught with disaster. It is a very common practice with many to persist in what is denominated "root treatment" for days, weeks, and sometimes months, in just such cases as this,—a practice that ought to be discarded and condemned.

In filling roots of teeth many methods are employed. The aim in every case should be to absolutely close the extreme end of the canal and the canal itself in such a manner as to prevent the entrance of septic matter or anything that would convey it.

Roots of teeth have been filled with lead, tin foil, gold foil, gold wire, gutta-percha in solution and solid, Hill's stopping in solution and solid. By any of these methods in skillful hands this work can be perfectly and efficiently accomplished.

The late Dr. Wm. N. Morrison, of St. Louis, practiced filling roots with gold wire made as nearly the size and shape of the canal to be filled as could be estimated, shaping the wire so that it would pass to the end of the canal; then covering the wire with a solution of gutta-percha or Hill's stopping and forcing it to its position in the canal, cutting it off in the pulp-chamber. The same method was adopted when lead was used instead of gold by the late Professor Peabody, of Louisville, Ky. Shaping the lead so as to fit as closely into the canal as possible, covering the lead with a gutta-percha solution, press or drive it to its place in the canal, and cut it off in the pulp-chamber.

Dr. H. J. McKellops follows practically the same method, using, however, a cone of gutta-percha or Hill's stopping the size and shape of the canal, moistening with a solution and pressing it to its place. These methods or modifications are much used in filling roots of teeth. Dr. C. R. Butler, of Cleveland, O., fills roots of teeth usually with tin foil, cutting into narrow strips, packing into the canal with an appropriate filling instrument, by this means absolutely sealing it. Gold foil used in the same way has no advantage over tin.

The methods of root management as above indicated are the most simple and the most successful. In the preparation of decayed teeth with open pulp-chambers, the tissue has at the present a great number of phases. The forms more simple than those already described are those cases where the pulp from exposure has become diseased and devitalized as the result, and is simply sloughed away or remains as lifeless matter in the canal, with little or no discharge from the foramen at the end of the root and no periosteal disturbance.

In these cases the requirements are: First, to wash out the cavity as thoroughly as possible with a syringe with a disinfectant fluid, then with an appropriate instrument remove all the *débris* that is not washed away; then open and shape the canal so as to readily facilitate the work to be done. Disinfection and antisepsis is always required more or less for these cases. It is well in some cases to remove more of the dentin from the walls of the canal than would be required in those from which a living pulp had recently been removed. This is necessary because the decomposing matter in the canal penetrates the dentinal tubuli and vitiates their contents to a greater or less extent, according to the susceptibility of this material and the offensive condition of the contents of the pulp-canal. The contents of the canaliculi of the dentin in many cases remarkably resists the pernicious influence of the fetid matter of the pulp-canal, but in other cases is highly susceptible to its infective influence.

In the latter case it is important that the walls of the canal be cut away so as to remove this offensive material. In such a case a thorough antiseptic and disinfectant treatment should be employed. In many cases much more should be done in the way of cutting from the canal walls than is done by many. For this purpose sulfuric acid may be employed with very decided benefit. It readily enters the canal by dissolving its walls, is an antiseptic, and would arrest decomposition of the contents of the dentinal canaliculi, so far as it could be brought in contact with it.

Care should be exercised in the use of sulfuric acid for this purpose, that it does not pass through the foramen at the end of the root, as it would there be an active irritant.

After the canal has been prepared in the manner suggested, it is important to determine whether there is discharge of any sort from the apical foramen into the canal; if so, that condition must be changed. This can in some instances be effectually done by thoroughly filling the extreme end of the canal. This procedure is practicable in cases where the flow is not copious and consists in the main of the plasma of the blood. This arrest may in some cases be promptly accomplished by the use of a coagulant packed well into the canal and permitted to remain for a few days. This method of treatment is usually efficient where there is but little discharge and of a limpid and inoffensive character, and with a good constitution. In many cases, however, the discharge is so abundant that neither sealing nor the use of the coagulant will be immediately effective, but either or both together may be used, checking the flow in part at least until the disposition to discharge is relieved. The discharge may come from a remnant of pulp in the extreme part of the canal, or in the absence of this it may come from the irritated living tissue just outside of the apical foramen. This treatment in many cases, especially those of the more favorable kind, will be effective in arresting the discharge in twenty-four hours. Whenever it has been accomplished, the canal may be promptly and permanently filled.

From the pulp-canals of many teeth, however, the discharge is acrid and proves a source of irritation, if promptly arrested or suddenly checked. In such cases disinfectant or antiseptic treatment may be used in connection with partial stopping, thus rendering the discharge less offensive and less irritating to the living tissue beyond.

Pyrozone, three per cent. solution, may be used in such cases daily with decided benefit. After this treatment tannin and oil of cassia may be used, and placed tightly in the extreme part of the canal.

Solution of salicylic acid may also be used with very decided benefit. If a remnant of pulp is found in the canal, it should always be removed before the treatment suggested. It is oftentimes the case that the sudden arrest of a discharge will prove an active irritant to the tooth at the apical space, and more or less pronouncedly to the entire surrounding membrane of the root. That should in all cases where possible be avoided by the proper regulation of the treatment employed. When the discharge in such cases is arrested, the canal and cavity should be properly and thoroughly filled.

I have thus far presented only the most favorable cases in the management of pulpless teeth, emphasizing only the following points: First, when the tooth-pulp is to be destroyed it is important to avoid any irritating or poisonous agents for this purpose. Anesthesia of course is in most cases required; this is readily accomplished with cocain either by injection or by cataphoresis. In many cases neither of these is required, but it is insisted that all poisonous agents should be avoided.

Second. The removal of *débris* and offensive matter from the tooth to be conserved should be most thorough. The utmost cleanliness and purity should be observed in every step of the work. The fluids of the mouth should be effectually excluded.

Third. Excavation in the canal is made for two purposes: one to enlarge and make it more accessible in every part of the work; the other where decomposition is taking place, especially in the contents of the dentinal canaliculi. In many instances all this offensive material may in this way be removed and thus the danger of further trouble lessened.

Fourth. The importance of arrest of the discharge that may be taking place from the pulp-canal. And let it be borne in mind that this usually does not involve a prolonged treatment. There are many cases that have been subjected to extended treatment, the results of which are disease and oftentimes loss of the tooth.

Under favorable circumstances nature always makes rapid work in the reparation of diseased tissue. I have, however, purposely omitted the management of pulpless teeth that have involved the surrounding tissue, those in which abscesses have been formed, and in which there may be diseased gums of one variety or another. These conditions may form a basis of consideration at another time.

### *Discussion.*

Dr. G. V. I. Brown, Milwaukee, was surprised to hear Dr. Taft advocate the use of cocain and cataphoresis for the removal of tooth-pulps. Most people had experienced the sloughing that follows the use of cataphoresis at times, and cocain had become pretty generally recognized as more dangerous than arsenic. The use of arsenic has been familiar in practice for so long, and the cases where it caused trouble have been so rare, that it would seem advisable to continue its use rather than to take up either cocain or cataphoresis, of which we have so imperfect knowledge.

Dr. F. C. Chamberlain, Colorado Springs, said that he had not found the trouble Dr. Brown speaks of with cocain; he uses it by injection, and has never had any serious trouble. Had had but little experience with cataphoresis, but it was not so satisfactory as to inject cocain. He uses an all-metal hypodermic syringe and warms it slightly in a Bunsen burner, so that the solution of cocain will be at about the temperature of the body. This causes it to be less painful when injected.

Dr. A. E. Baldwin, Chicago, said he did not agree with Dr. Taft's paper; he thought there were better methods. In his opinion the use of arsenic was much to be preferred over the use of cocain for removal of tooth-pulps, and he did not think it possible any evil effects should come from the minute portion of arsenic necessary if it were sealed into the cavity carefully as it should be. He had tested the pulp of a cuspid to see how the arsenic acted upon it. After it had been devitalized he removed it from the tooth. It looked like a string; he divided it into thirds, and tested the lower third for arsenic with absolutely negative result. He could not get any indication of arsenic. He decided that under action of the arsenic the pulp was killed by inflammation and strangulation, a passive congestion. If this be true, the pulp is destroyed by simple irritation and not by absorption of the arsenic. He thinks that the action of the arsenic is self-limiting, and had found it very safe in his practice. He preferred to depend upon methods of practice which had had a longer history than cataphoresis. He had supplied himself with a cataphoric apparatus, but had never gotten much satisfaction from its use, and would not use it again. In treating a tooth with an exposed pulp, the important steps are, first to destroy the life of the pulp, then remove all traces of dead tissue and fill the canal by any means that would seal it completely.

Dr. A. H. PECK, Chicago, said he had listened with pleasure to the paper, as he was especially interested in the subject. It is a broad field, and affords us great opportunity to make mistakes and cause ourselves trouble. We should explore it carefully, and become so thoroughly familiar with every phase of the subject that we will always understand what we are about to do.

He was disappointed that the paper did not describe different modes of treatment when varying conditions were present. Time does not allow us to go far into detail, but such details are important. He had seen so much damage result from the use of cocain that he felt safe to say that it should never be used subcutaneously, that is, by injection. It is one of the most uncertain, unreliable, and, if he might be allowed the expression, most damnable drugs we have in our offices. We may feel that we know how other drugs will act, but cocain may give most serious results with one patient, while used in the same way with others there will be no unpleasant action. Again, it will give trouble with a patient who has had it used in the same way with him before with no unpleasant sequence. As far as he had learned, there was no way to judge how it would act; the only safe way was not to use it.

Dr. H. D. NEWTON, Salida, Col., said that the weaker solutions of cocain were safe and useful; he had had much experience with it, and was quite satisfied that, properly used, it was a safe agent.

Dr. BROWN said he had not meant to be quite as sweeping in his denunciation as his words seemed to convey. In weaker solutions it was not objectionable, but he intended to condemn especially its use in connection with cataphoresis until we are much better acquainted with its action. Something over a year ago he had reported a case to which he had been called. The cataphoric current had been applied for the removal of a crown. The patient's mouth exhibited an inch or an inch and a half of the jaw quite bare, the mouth filled with pus and the tissues sloughing. He learned that a few hours after the cataphoric current had been applied the patient's mouth had swelled so extensively that it was only by the most heroic treatment that his life had been saved. He lost not only the tooth operated upon, but the next one, and suffered severely from poisoning from the pus.

Dr. BALDWIN said it was often possible to obtain good local anesthesia by injecting pure distilled water with an aseptic syringe. We do not understand why, but the results are so good as to be surprising. Of course the patient should not know that only water is being used. He related an incident which occurred while he was an interne in a hospital. In one ward there were a number of patients who had to be "doped" every night with morphin solutions before they could sleep. He learned that when the solution was all gone the nurses used water, and the effect was perfectly satisfactory.

Dr. J. N. CHIPLEY, Pueblo, Col., spoke of the use of distilled water and three per cent. pyrozone as a local anesthetic. Injected into the gum, it turns it white and anesthetizes it perfectly, the effect lasting from five to ten or fifteen minutes.

Dr. TAFT, closing the discussion, said the presentation of the paper was to set forth briefly the mode of practice he had used. He had not used arsenious acid for devitalizing pulps for twenty years. When he did use it, he had had so much trouble that he was glad to avoid its use. He never destroys a pulp where there is a possibility of preserving it. When it is diseased, of course it must be destroyed and removed. His former method was to apply a spray and reduce the temperature till the pulp could be removed painlessly. Sometimes he inserts a broach, without any anesthetic, and cuts the pulp off with much less pain than usually accompanies the use of arsenious acid. He also had used cobalt, or arsenite of cobalt, just as successfully as arsenious acid, usually with much less irritation than with arsenious acid, though not always. For the last four years he had used cocain, injecting it and placing a particle of cocain crystal on the pulp for a few minutes, then injecting a few drops into the pulp. He could not conceive that cocain used in this way would give trouble. He had never used cocain by injection for extraction. Had experimented in many different methods, with very varying results with different people. Had never had any unpleasant experiences with cataphoresis, though he had used it in many cases. While there were so many agents at our command, he did not see why we should use so dangerous an escharotic as arsenious acid.

When a pulp is taken out of the root of a tooth, if the pulp-cavity and the canals are thoroughly cleaned the tooth is in the best possible condition for being filled; no further treatment is needed, nor can it be beneficial. Of course when the pulp has been dead for some time and the canal is filled up with *débris*, and sometimes the tooth itself is changed in color and the tubules of the dentin are filled with dead matter, it will be necessary to put it in an aseptic condition.

The change of color in a tooth with a dead pulp is produced by the decomposition of the contents of the canals. As for the injection of distilled water for the purpose of producing local anesthesia, the effect could be only imaginary.

The subject was passed, and the Section adjourned till next day.

(To be continued.)

# UNION MEETING OF THE MARYLAND STATE DENTAL ASSOCIATION, WASHINGTON CITY DENTAL SOCIETY, AND VIRGINIA STATE DENTAL ASSOCIATION.

(Continued from page 859.)

## FIRST DAY—*Evening Session.*

THE following paper was read by Dr. C. J. ESSIG, of Philadelphia, Pa:

### THE RELATION OF EXAMINING BOARDS TO DENTAL EDUCATION.

The evolution of the Boards of Dental Examiners with their present relations to college graduates, as might be expected, is viewed with the keenest interest and more or less resentment by the dental colleges, and in this sentiment they are supported by many members of the profession who are not teachers. Ostensibly the function of the examining board is to ascertain whether applicants for license to practice dentistry are properly trained in the different branches of the dental curriculum. This is understood as implying distrust of the work done by the colleges, whose diplomas the candidates for license to practice hold as evidence that they have been properly taught the different branches required in a dental education.

Viewed from the teacher's standpoint, the resentment felt by these gentlemen is not unreasonable, when it is remembered that the advancement made by the dental profession since 1840 has been by the labors of the colleges, or by the action of their representative, the National Association of Dental Faculties. The fact that the candidates for the delicate and responsible office of examiners have not always been men of high attainments, and the knowledge that the politics which has been so offensively conspicuous at our annual meetings has not unfrequently been brought into play by individuals to have themselves appointed or elected to membership on examining boards, has served to intensify the distrust felt for their fitness. Procedures of that kind are at variance with the dignity supposed to belong to the professional man and the sincere interest every dentist should feel for the welfare of his profession, sentiments that might be expected to inspire him to wait for the office to seek him, instead of thrusting himself forward to seek it. Resentment is often further intensified between colleges and examiners, by the disposition of the latter to arrogate to themselves the right to regulate the curriculum, a function usually supposed to belong to the former.

The knowledge we have of the great work for the improvement of dental education that has been accomplished by the National Association of Dental Faculties would lead to the thought that no necessity existed for dental examining boards, and that the dental profession might safely leave the direction of the education of students to the former body; but while that organization has the power to make rules for the regulation of the curriculum, such as the naming of the branches taught, length of term, number of college years, etc., it has no means of knowing whether students are held by the college faculties to a strict attendance on lectures and the performance of their technical and clinical work; that knowledge can only be obtained by examinations of the students themselves, and this duty has not always been well done.

The writer is reminded of an instance which occurred at the meeting of the American Dental Association, at Boston, in 1880, which will serve to show that examinations by dental faculties have not invariably been successful in ascertaining the fitness of candidates for graduation. Complaint was made at the meeting of the committee on dental education, the predecessor of the Association of Dental Faculties, that a man had been graduated by a dental college after but four months' attendance and without having had any "previous practice." The dean of the college which conferred the degree stated in explanation and extenuation that the man had deceived him in claiming that he had been in previous practice for five years, and that "in future" the college which he represented meant to insist upon such matriculates making oath to previous practice before a notary public. It is perfectly plain that in the case alluded to the college examination completely failed to discover the utter unfitness of the candidate for the dental degree. While such isolated examples of superficial work on the part of the colleges are often given as reasons for the existence of examining boards, it must be remembered that under the rules of the Association of Dental Faculties such an incident could not happen at the present time, and the question may be asked,—do the Examining Boards succeed any better? Many instances might be produced to show that they do not.

A careful study of the causes which really operated to bring into existence dental examining boards is sure to awaken some very curious phases of the question, but it would be difficult to agree with the editor of a dental journal who makes the statement that "communities in which diplomas are granted have the least respect for the sacred parchment," an assumption at once ungracious and incorrect. It will probably be found by a thorough study of the subject that the public had nothing to do with bringing the examining boards into existence; that it feels no interest in the subject at all, and is generally quite as willing to patronize the empiric as the college graduate. It is largely to the jealousy of graduates, engendered by the failure on the part of the "community" to discriminate between the graduate and the non-graduate, and with other motives of self-interest, that examining boards are in existence to-day. Does any one suppose that the act of the General Medical Council of Great Britain excluding graduates of American colleges from practicing in England, until they have passed an examination prescribed by that body, was in response to demands of the public? If so, it would be interesting to know why many of those American graduates enjoyed such remarkable success in acquiring large practice before the existence of that law.

The first dental law of Pennsylvania was intended to make it illegal for any man to practice dentistry without the diploma of a reputable medical or dental college. It was conceived and gotten before the legislature of the state by members of the dental profession. The representatives of the people, however, rejected it because, as they stated, it was in the interest of dental colleges and college graduates. In order to get the bill passed by the legislature it was necessary to amend it so that an examining board, consisting of six members of the State Dental Society, was created and authorized to examine any individual regardless of the sources from which he derived his knowledge of the several branches which are recognized as essential to a dental education. As might be expected, but little good was accomplished by this board, which finally became inoperative; it was never satisfactory to the more intelligent members of the profession, and was accepted reluctantly as an entering wedge in the attainment of needed legislation which would check the practice of dentistry by empirics.

It cannot be denied that a few years back the want did exist for an authorized supervising body to check the superficial work done by some of the colleges, but the colleges themselves have applied the remedy in organizing the National Association of Dental Faculties, and the adoption by the latter of many improvements, such as uniformity in number of college years and general requirements; but it is one thing for the National Association of Dental Faculties to prescribe the rules and limitations of the dental curriculum, and quite a different matter for the dental colleges to teach thoroughly and systematically the detail of the branches thus prescribed. It is quite evident that discipline and improved methods of instruction in the purely dental branches are at the present time the improvements most needed in the schools; these are, however, defects not likely to be discovered by the examining boards; none but the teacher, with his experience and special training, will be likely to see and remedy them.

Viewing the question from the standpoint of both examining boards and dental colleges, it would seem that the former, brought into existence and maintained by the dental profession (as they claim) for the good of that profession, have valid reasons for their espionage of the work of the dental schools, and to ascertain whether the technical requirements are thorough enough to carry the student over the main feature of prosthetic and operative dentistry, etc.; and yet are they the proper bodies to do this? Have they the perspicacity to discover existing defects in the system? Can they compare in these respects with the Association of Dental Faculties?

The cost of conducting a dental school of the present day, with its graded prosthetic and operative technical work, its laboratory instruction in chemistry, histology, and bacteriology, its practical anatomical work, necessary apparatus, and large corps of demonstrators, is enormous, and yet it is assumed by at least one of the "Examining Boards," whose "new dental law" is described as "inferior to none and superior to all," that this work can be done just as well without this elaborate equipment.

Institutions of learning are very much like other kinds of corporations in that they are compelled to keep in mind the important question of income. The absence of endowment doubtless to some extent influences the colleges in respect to their willingness to adopt improvements that tend to reduce the number of students, such, for instance, as lengthening the term, going from a three to a four-year course, raising the standard of preliminary or entrance education, making requirements more difficult, etc., or if the dental school is a department of a medical college or university, there is danger of its being made a feeder to make up deficits in other departments, a condition which would seriously handicap it in its own development; as, for instance, in the selection and compensation of that most important factor in the practical work of the school, its corps of demonstrators. This state of things is a misfortune rather than a fault. Impecuniosity has always been the *bête noir* of the dental colleges; none of them are endowed, and it may be said that endowments do not go their way. The development they have made has been brought about by the enthusiasm and devotion of the teachers, and the sacrifice on their part of time, money, and comfort.

An inflexible standard of attainment for graduates fixed by an ideal examining board might assist the colleges in their labors, and at the same time place the responsibility for the preparation of candidates for the dental degree where it properly belongs. Doubtless the majority of dental teachers would be only too glad to be relieved of the arduous labor of the final examinations if performed by a board of examiners in whose fitness for such work they could have full confidence; but they know very well that the experience and training required for the proper performance of that duty is not likely to be found in examining boards. The examining boards might also render valuable service to the cause of dental education in helping to maintain a proper balance between the practical and theoretical (medical) branches. When the school is a department of a university or medical college, and its course of instruction is concurrent with the medical course, there is always danger of a conflict of opinion between the members of a faculty so organized regarding the importance of their respective branches. Naturally the incumbents of the chairs of anatomy and physiology and chemistry will require the dental students to show as high attainment in these branches as would be required of the medical students. It could hardly be expected of them to be satisfied with different degrees of proficiency in the classes who sit under them, but such a condition of affairs sometimes works great disadvantage to the dental student by crowding and even seriously abridging his opportunity for practical training. In such cases a really capable examining board would be the final tribunal to discover defects in knowledge or skill in the dental branches properly so-called, but on the other hand it is doubtful whether examinations by state boards can ever be as thoroughly done as are those of the colleges. Examinations, whether oral or written, though not the only means of ascertaining the progress of students, require on the part of the interrogator experience and close observation of the manipulations carried on in the class-rooms and laboratories. Students will sometimes give correct answers learned parrot fashion, and yet in their practical work show complete ignorance of the principles involved. It might be supposed that teaching a practical branch is pre-eminently a practical matter; but it will be found that there is a theoretical side, having for its aim the application of principles which elucidate the reasons why for all plans and mechanical procedures. The student can hardly be said to understand a principle until he is able to apply it; in this lies the difference between teaching and coaching. It is exceedingly doubtful whether the examining boards will be able to make this distinction.

The system of dental technics which has become an important part of the dental curriculum, while undoubtedly the most important addition recently made to the practical course of instruction, may, after all, supply nothing but finger skill, unless the technical operations are taught as practical applications of principles. There should be a plan made for every prosthetic or operative procedure, and, to make the instruction systematic, every step in construction should be taught as a necessary sequence of the preceding one; but it is doubtful whether any serious attempt has been made to train students in this direction. The few exceptionally bright men found in every class of dental students need but the merest hint of a principle to enable them to grasp its full significance; the majority, however, must be required to apply every precept, which is given to them didactically, to actual practice, and these must be demonstrated many times before they are understood. The teacher must learn to put himself in the place of the student; he must have imagination, intelligence, and patience. The experience which he gains in his relations with students fits him for the duty of examining, and he is, therefore, better equipped for such work than are members of examining boards, who do not meet with the candidates during their student days.

It cannot be truly said that any of the improvements which have led to the present dental curriculum have emanated from examining boards, or that their examinations are as thorough as are those of the college faculties. Their position would seem to be, when carefully studied, anomalous and peculiar, as, for instance, in the question of attainments between examiners and graduates. Generally it is supposed that an examiner should have better knowledge of the subject on which he examines than those whom he examines, yet there are colleges whose freshmen studies and examinations for advanced standing are so numerous and exacting that it is exceedingly doubtful whether the members of the examining boards could pass them successfully.

It will not be denied that the ideal examining board might be helpful to the colleges, a safeguard to the dental profession and a stimulus to the students, but the personnel of such a board must be high in character and professional attainments; and it must be composed of up-to-date men, or it will soon be completely outclassed by the graduates. Indeed, so earnest and conscientious are the colleges at the present time in their efforts for a higher standard of attainment on the part of their graduates that it will probably be they, and not the examining boards, who will lead in the race for higher education.

As to the future of the different organizations alluded to in this paper, the colleges are now on a very permanent foundation, and the National Association of Dental Faculties is essential to the uniformity and efficiency of their work. The colleges rank the others in date of existence, but in order of official duties the Association of Dental Faculties prescribes the work for the colleges. The examining boards are supposed to see that it is well done. How long they will be needed or tolerated remains to be seen; any one who can read the signs of the time will be likely to ask,—if the colleges keep up their present activity, what use can examining boards be in the future?

It is quite evident that discipline and improved methods of practical instruction in the purely dental branches are, at the present time, the improvements most needed in the college. The apathy of students has so often been commented upon that it seems superfluous to refer to it here. Certain it is, however, that the majority of them can only be held to a faithful performance of their work by a more rigid discipline than has yet prevailed in the colleges, and that this will be well thought out and adopted without help from examining boards cannot be doubted.

The future existence of boards of dental examiners will depend upon the degree of harmony which they maintain with the colleges and the dental profession in their efforts to elevate the standards of preliminary and professional attainments. And yet there are unmistakable signs of antagonism and rivalry on the part of the boards to the educational institutions. The following extract from "the revised law" of a neighboring state is one example: "Any person now registered as a student may present himself for examination to the board upon complying with the provisions of this act relative to examination, and presenting to the board a certificate, under oath from the dentist or dentists with whom he has studied, that such applicant has studied as a student with the dentist or dentists so certifying for not less than five years continuously; provided, however, such applicant shall have filed on or before the first day of June, eighteen hundred and ninety-eight, a notice with the board that it is his purpose to avail himself of the exemption hereby made. The board may, however, at any time, upon proof of the violation of any of the provisions of this act by such student, revoke his right to present himself for and pass such examination."

The clipping from the current number of a dental journal is another example:

"The Board of Dental Examiners of Georgia held a three days' session last week and passed upon forty applicants for license. It is said that a license from this board is more appreciated than that of any other state, *and more appreciated than a diploma from the ordinary school.*"

It would be difficult to correctly imagine the astonishment and indignation it would create if the Association of Dental Faculties announced that hereafter it would sanction the granting of diplomas to candidates on account of five years' previous practice, and that systematic college training would no longer be insisted upon; yet the ingenuous announcement of an enormously retrogressive step of a body legally authorized to ascertain the fitness of candidates for license to practice dentistry will attract very little attention, and the only logical reason which can be assumed for indifference on the part of the profession to a matter that at first might be thought exceedingly injurious to the cause of higher dental education, is that the profession in general feels very little interest in examining boards, and does not look upon them as at all essential to the maintenance of a high standard in the dental schools.

The position assumed by the particular board, part of whose law is quoted above, must seem to those who are really striving for higher standards of education as almost suicidal; for by this announcement they place themselves at variance with the colleges and the better part of the dental profession, while their action seems to confirm the frequent charge that their existence is due in many cases more to the efforts of individuals who have chronic grievances with colleges than with a widely diffused professional interest in the cause of dental education.

This retrogressive step of one examining board will bring more discredit upon such organizations in general than all the lapses of duty of which they may previously have been guilty. For if the standards of some of them have been low, there is always hope of improvement; but a backward step such as herein quoted extinguishes all promise of helpfulness in the work of dental education. It evinces their disposition to transcend their proper function, and assume the entire direction of the education and training of students. It shows also lamentable ignorance of methods of training and educating students, when it assumes that five years of necessarily unsystematic and incomplete work with a practicing dentist can fit a student for intelligent practice of dentistry. The probability is that the larger part of the five years would be spent in laboratory drudgery, the busy preceptor having little time to spare in the direction and grading of the "assistant's" progress; besides, all dentists are not born teachers, many have no fitness whatever for that function. On the other hand, the colleges are organized for the purpose of systematic instruction, and the student is environed by conditions which compel him to acquire skill and knowledge. Examinations of candidates for license to practice, who have not had systematic college training, can amount to little more than child's play in the estimation of experienced teachers, and examining boards who advocate that line of procedure would carry our profession back to its swaddling days; but it is not probable that they will have the co-operation of that portion of its members who have influence to mold its affairs.

## *Discussion.*

Dr. Richard Grady, of Baltimore, considered the topics discussed in Professor Essig's able paper of great importance, although he did not share all his views. He admitted Dr. Essig's charge that there are dental examiners who are not men of high attainments and who had not waited for the office to seek them. He said that the Maryland State Dental Association had been the friend and well-wisher of its dental board, to which it had unanimously pledged moral and financial support; but it declined to agree with the officers of the board who asked that the law be amended to read: "No examination papers shall be open to the inspection of any person whatsoever save the members of said board," and voted that examination papers should be subject to inspection by members of the association and by those examined. In the prophetic words of the late Dr. Garretson to him, "I am afraid, my dear doctor, that dentists have so engaged themselves in law-making that trouble will come in large share sooner or later."

Answering Dr. Essig's question, How long will dental examiners be needed or tolerated? Dr. Grady said that in Maryland only one dental graduate had been rejected in fourteen years, and that no graduate of the Baltimore schools had ever been rejected. It may be presumed, he said, that dental examiners were as well if not better qualified than the teachers on whose work they passed; but it goes without saying such is not the case; and this fact and their presuming to meddle with the curriculum explains the resentment of the dental schools and of broad-minded dentists. In conclusion, Dr. Grady congratulated Dr. Essig on having the courage to point out the weaknesses and infirmities of dental legislation, although he would likely call down upon himself unpopularity and even hostility, as all men do who tell unwelcome truths.

Dr. Wms. Donnally, Washington, D. C. I hold myself in readiness to defend the cause of wholesome, reasonable, and wise legislation, and to combat the idea that "the advance in the profession is due *solely* to the labors of the colleges," as Dr. Essig claims. Besides, I know from experience how hard it is for us to get the kind of laws we need,—laws that are consistent and have for their object the best interests of the people and incidentally the best interests of the colleges.

Dr. A. B. King, of Baltimore, believed that dental boards were needed, and affirmed that the work of the Baltimore schools had improved in the past two years because of board examinations.

Dr. J. Bond Littig, of New York, caused applause by insisting that a certificate issued in one state should be recognized in any other state.

Dr. Wm. A. Mills, of Baltimore, speaking for Maryland, said that such an effort had been made with the last legislature, and that he had been told the bill had been "killed" intentionally. Dr. Mills promised that when the State Association met he would insist that the dental board, which was created by the association, should be instructed to interpret the law as intended by that body.

(To be continued.)

# DENTAL SOCIETY ANNOUNCEMENTS.

## NEW YORK ODONTOLOGICAL SOCIETY.

### PRELIMINARY NOTICE.

THE New York Odontological Society will celebrate its thirty-first anniversary on Tuesday, January 17, 1899.

On this occasion the society will hold an afternoon and evening meeting, and J. Leon Williams, L.D.S., D.D.S., of London, has prepared a paper for each session, and will be present to read them.

*Afternoon Paper.*

"ON CERTAIN CONTROVERSIAL QUESTIONS AND UNSOLVED PROBLEMS IN DENTAL HISTOLOGY AND PATHOLOGY."

*Synopsis.*—A criticism of the recent paper on the structure of enamel by Dr. Otto Walkoff.

Further researches on enamel structure, with a critical review of the paper on tubular enamels recently presented before the Royal Society of Great Britain by Mr. Charles S. Tomes, F.R.S.

An examination of the special forms of acid-forming bacteria found attached to the approximal surfaces of teeth.

A brief review of the work of Dr. Filandro Vicentini on the fructification of Leptothrix buccalis.

Illustrated by numerous photographs.

*Evening Paper.*

"WHICH SHALL IT BE, THE SCIENTIFIC OR THE EMPIRICAL METHOD?"

*Synopsis.*—An examination of the present scientific status of the dental profession in America as shown by its recent literature.

The results not altogether flattering.

Indifference toward scientific research.

The empirical spirit and method.

The scientific spirit and method.

Are we to have a trade or a profession?

The question not yet decided.

The duty of the colleges; the duty of the societies; the duty of the individuals.

The question of patents and secret preparations.

The French Academy of Medicine.

A plea for the formation of a new national organization with an established fund and state branches whose function it shall be to promote original research and all scientific work connected with the profession, and to examine and pass judgment upon all inventions, formulæ for remedies, etc. Such an organization, if properly formed and managed, certain to prove a wonderful stimulus to progress in all directions, and, at a single blow, to destroy all quack remedies and useless inventions. An advance of twenty years at a single step.

The unification of the state laws regulating practice.

Shall we go forward or backward?

B. C. NASH,
F. T. VAN WOERT,
W. W. WALKER, Chairman,
*Executive Committee.*

## MASSACHUSETTS BOARD OF REGISTRATION IN DENTISTRY.

A MEETING of the Massachusetts Board of Registration in Dentistry, for the examination of candidates, will be held in Boston, Monday, December 5, 1898, at 10 A.M., at Harvard Dental Infirmary, North Grove street. Examination in Operative Dentistry at 11 o'clock.

Each candidate must come prepared with rubber-dam, gold and instruments, to demonstrate his skill in operative dentistry. Any one who wishes may bring his patient. So far as possible patients will be furnished.

The theoretic examination will include Anatomy, Physiology, Histology, Chemistry, Pathology, Materia Medica, Operative and Prosthetic Dentistry, Mechanical Dentistry, Therapeutics, Surgery, Metallurgy, Crown- and Bridge-work, Orthodontia, and Anesthesia.

All applications, together with the fee of twenty dollars, must be filed with the secretary of the board on or before November 28, as no application for this meeting will be received after that date.

G. E. MITCHELL, D.D.S., *Secretary*,
25 Merrimack st., Haverhill, Mass.

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# EDITORIAL.

## THE BACTERIAL FACTOR IN PHAGEDENIC PERICEMENTITIS.

IN the August issue of this journal the writer presented, in a paper entitled "Abscess upon Teeth with Living Pulps," some considerations tending to throw light upon the disorder in question, and especially as explaining its etiology.

Certain points were emphasized: First, the necessity of a specific irritant; second, a predisposing cause; third, the nature of the tissue which was the seat of the disorder; fourth, the analogy of the particular disorder in question with arthritic disorders in general; fifth, the pathological identity of pericemental abscess with one of the forms of so-called pyorrhea alveolaris.

As to the specific irritant, it was contended that the toxins produced in the human organism by imperfect or altered metabolism played an important *rôle*, both as specific irritant and as a sufficient predisposing cause. As to the nature of the tissue in which the disorder found expression, particular attention was directed to the lymph-glands of Black as the seat of the inflammatory process, and the suggestion was made that the lymph-glands of Black might probably be imperfectly developed synovial structures,—the anatomical character of the dento-alveolar articulation being cited, among other things, in favor of that view.

The fourth contention, as to the analogy of this disease with other forms of arthritis, was supported by their pathological similarity, and the almost uniform co-existence of the disease with other arthritic manifestations. The fifth contention, as to the pathological identity of pericemental abscess, was maintained upon the ground that the only difference in the two disorders was the accident of location, which determined the direction and position of exit of the abscess contents.

More recent study of the problem has developed the belief that the lymphoid cells, found and described by Black in the glandular structures which he discovered in the pericemental membrane, were, in all likelihood, inflammatory products, especially as he reports that in the tissues which he had under investigation the glands "were the seat of phagedenic pericementitis." With regard to the modus of infection of these glands, the following statement was made in the paper on "Pericemental Abscess:"

> "When we endeavor to explain the etiology of abscess of the pericementum of vital teeth as a result of infection by bacteria, the relation of cause and effect is less obvious because the possibility of access of bacteria or their ptomaines via the pulp-canal is eliminated as a factor, and the modus of the infection must be sought elsewhere. There being no break in the continuity of the gingival attachment in the cases under consideration, we naturally consider the vascular circulation of the tissue as the most probable means of entrance for the irritant which is the exciter of the inflammation in question. That pathogenic bacteria may exist in the blood-stream and, meeting a *locus minoris resistentia* in a tissue, may set up an inflammatory process at that point is a well-established pathological fact, and it is not at all impossible that the immediate cause of pericemental abscess may be accounted for in that way."

The foregoing view, however, needs qualification in the light of subsequent investigation, for, although Black was unable to fully demonstrate the existence of a duct opening upon the surface, it is highly probable that a duct or channel leading from the gland to the surface or close to the surface of the gingival margin exists; probable, for the reason that the presence of a gland in a tissue implies work being done by the gland, and the function of a gland of the type described by Black would necessarily be the secretion of fluid, which, if continued, would have to find an exit. Therefore, the existence of a duct terminating upon the surface would afford easy access to infective bacteria, which could readily become the exciters of the necrotic inflammatory process in a tissue vitally depressed.

A recent publication by Mr. Dencer Whittles, of Birmingham, England,* has such an important bearing upon the question at issue that we reproduce it here in full:

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***Anatomischer Anzeiger*, XV. Band, No. 7, 1898.

# A PRELIMINARY REVIEW ON PROGRESSIVE INFECTIVE ULCERATION OF THE PERIODONTIUM OR ALVEOLAR DENTAL MEMBRANE.

BY DENCER WHITTLES, L.D.S.R.C.S. ENGL. (BIRMINGHAM).

Much has already been written upon this vexed condition, under various titles, perhaps the more familiar one being that of pyorrhea alveolaris or Riggs's Disease. Unfortunately, the term has been applied to any condition in which there has been an escape of pus from around the roots of teeth. This is most confusing, as I believe the originator of the title intended it to be used only where there was wasting of the alveolar walls going on and subsequent loss of the tooth or teeth, by its bone of attachment atrophying on account of the periodontium (or periodontal membrane) being destroyed.

It is unnecessary for me to give a lengthy description of the local appearances of the disease and its effects upon the immediate surrounding muco-periosteal tissue, except to call attention to the peculiar characters of the edema, this being somewhat coriaceous and resilient to touch; its bluish-purple color, denoting a considerable amount of venous congestion, and nearest to the periphery of the tooth-socket; complete thrombosis of the vessels produced by the proliferation and disintegration of the tissues, consequent upon the infection.

The character of the pus is peculiar, being very greasy in comparison to that found in an acute abscess, the result of the ordinary pyogenic bacteria.

Is this greasiness and its difficult separation of the granules with water prior to mounting cover-glass specimens for microscopical examination due to fatty degeneration? or it might be due, in my opinion, to the disintegration of tissue in which the lymphatics are largely concerned, as from my own observations I have reason to believe that there are to be seen in such cover-glass specimens crystals of stearic acid; this I intend to clear up when more cases have come under my notice.

The assigned causes of the disease are numerously vexatious, and in the opinion of the writer a diagnosis on the part of the dental practitioner should not be given until he has quite satisfied himself that he has before him a *bona fide* case of Riggs's disease, and not one where only the presence of a little calculus is sufficient to effect a local ulceration and not an infective progressive ulceration of the periodontium.

During the past two years the writer has without exception examined microscopically all suspected cases of Riggs's disease, and before deciding upon treatment has found in all genuine cases the presence of a particular bacterium, which is probably of the anaërobic variety.

The discovery of this organism led the writer to find an efficient antidote, which, from the condition of the parts described in the earlier part of the paper, suggested it should be of the nature of a stimulant rather than that of a depressant, and so far the medicament has not failed in a single case.

On the second succeeding day of application microscopical examination showed an entire absence of the micro-organisms, which were previously plentiful, and there was much less turgidity of the muco-periosteum in connection with the periodontium. The writer has not been as yet able to obtain tissue (either from the living or the recently dead subject) to confirm the supposed connection of the effects of the organism with the lymph-channels.

The cases which have come under notice have had histories of duration from a few months up to ten years, and even such chronic cases as the latter, which necessarily had been under other treatment to retain any teeth at all, such as copper sulfate, pyrozone, etc., answer readily to the prescribed antidote, which consists of green iodid of mercury triturated in a mortar with a little glycerol, to allow of greater readiness of application to the sulci of the affected teeth. The efficacy of the prescription is easily discernible by the fact of the tissues readily bleeding after the first and second application, which is best done on a small chisel-shaped piece of orange-wood (metal must not be used) fixed to a small holder; of course using a fresh one in those positions where the teeth are unaffected as an extra precaution, although the writer is convinced that the mercurous iodid is sufficient to destroy an infection if inadvertently made. The pain and general discomfort disappear, and the patient can masticate with comparative ease, even during the early treatment, and the discharge of pus on pressure rapidly disappears, while the muco-periosteum rapidly assumes a more healthy appearance.

The writer is inclined to look upon this disease as another example of those affections which accompany a general lowered condition of the mesoblastic element as a predisposing cause, the real excitant being a bacterium. The presence of a special kind of calculus beneath the gingival margin is more probably due to the irritation of the mucous glands, consequent upon the disease affecting the periodontium, rather than to its presence being the exciting cause of the trouble, and therefore only secondary in importance. This somewhat causes the writer to differ from the alleged causes, such as the gouty diathesis, etc., producing the condition described as progressive infective periodontitis.

Having briefly touched upon the more important points of this much-discussed disease, the writer will be grateful if dental practitioners will co-operate with him in publishing results of their investigations, for the substantiation of the assigned cause and cure of the disease in question.

If the observations made by Mr. Whittles are confirmed by further investigation, it would seem that a rational explanation of the etiology of phagedenic pericementitis is near at hand. It would be, in addition, a vindication of the position maintained by those who believe that the immediate exciting cause of phagedenic pericementitis is a bacterial infection,—a view long held and maintained by Professor Truman. The constitutional factor which determines the predisposing cause is, we believe, clearly made out to be a lowered vital resistance of the tissues which are the seat of the disorder, resulting from malnutrition induced by any of its well-known causes, among which and most prominent of which is lithemia or the gouty diathesis.

In view of the well-known relationship of gouty pericementitis to other arthritic disorders, it would be extremely interesting and important to determine whether the particular bacterium described by Mr. Whittles is to be found as the excitant of inflammatory conditions in other forms of arthritis.

The subject of pyorrhea alveolaris, although it has formed the basis of much speculation and study for many years, has been without a rational explanation as to its etiology; until that has been accomplished we cannot hope to scientifically or successfully treat it, and it is to be hoped that the co-operation asked for by Mr. Whittles will be generously accorded until the problem is finally solved.

# BIBLIOGRAPHICAL.

A Dictionary of Dental Science, and such Words and Phrases of the Collateral Sciences as Pertain to the Art and Practice of Dentistry. By Chapin A. Harris, M.D., D.D.S. Sixth Edition. Carefully revised and enlarged by Ferdinand J. S. Gorgas, M.D., D.D.S. Philadelphia, P. Blakiston's Son & Co., 1898. Price, cloth, $5.00.

In its title and in the preface to both the fifth and sixth editions of this work it is set forth that the book is a dental dictionary, though the editor proposes to include not only purely dental words, etc., but all the medical, surgical, and other terms which the dental practitioner and student may require. This qualification undoubtedly permits of much latitude in the selection of the words included, a latitude limited only by the lexicographer's conception of what may properly be regarded as belonging to dental nomenclature.

That the editor's view of the scope of dentistry is a broad one cannot be doubted, if the terms defined in the book are to be taken as an index. Ophthalmology, gynecology, obstetrics, general medicine, general pharmacology, dermatology, otology, insanity and mental diseases, and numerous other branches of the healing art are represented. We fail to see why a dental dictionary should be cumbered with so much that is not immediately useful to the dentist. A dental dictionary should be a dictionary of dental terms; words not cognate to the subject should be omitted, and when needed by the dentist be sought for in the general dictionaries of the language or those devoted to its special departments.

The effort of the editor to make the work comprehensive has led him into the error of making it too voluminous and diffuse. This is shown not only in its general scope, but by the introduction of many words which are of infrequent usage, or even obsolete.

Again, a dictionary is not a treatise nor a text-book, but a word-book, and its descriptive matter should not go beyond what is needed to expound the derivation, meaning, pronunciation, and etymology of the words used. Theories, processes, controversial discourses, etc., should have no place in a dictionary; but in this they abound.

The work needs a thorough weeding out of its superfluous matter, and such an editing as would bring the result within the limits of a dictionary as that word is now defined in our standard lexicons.

L'ART DENTAIRE EN MÉDECINE LÉGALE. By Dr. OSCAR AMOEDO, Professor à l'Ecole Odontotechnique de Paris. Paris, Libraries de l'Academie de Médecine, 1898.

This work is an interesting collection of essays dealing with the teeth, their anatomy and pathological relationships, and the medico-legal aspects of dental practice. The first chapter is devoted to an exposition of dental anatomical nomenclature, followed by a section upon descriptive dental anatomy, supplemented by a consideration of anomalies, the racial peculiarities of teeth, and the teeth of degenerates. General pathological conditions having a dental relationship are next fully set forth, after which the several diseases originally affecting the teeth themselves are discussed. We note a misstatement of the position of a number of American authors with respect to the significance of uricacidemia in its relation to dental erosion, which should be corrected,—viz, that uric acid is the corrosive agent which causes dental erosion. Uric acid is not a corrosive agent, and so far as we are aware no author, American or otherwise, has ever regarded it as the direct solvent responsible for erosion. It is, however, believed to be the irritant which brings about an acid reaction of the secretion of the labial mucous glands, the acidity of which is probably caused by hydrogen sodium phosphate, a proposition fully set forth in Burchard's "Pathology and Therapeutics," as well as in essays by other writers.

An interesting feature of the work is the study of tooth disorders produced by various callings,—*e.g.*, of musicians, glass-blowers, workers in chemical industries, etc. The medico-legal aspect of dentistry is elaborately set forth, and much interesting matter relative to that subject is included. Dr. Amoëdo deserves the thanks of the profession for bringing together in one readable volume much valuable dental information not otherwise easily accessible.

ANATOMY AND HISTOLOGY OF THE MOUTH AND TEETH. By I. NORMAN BROOMELL, D.D.S., Professor of Dental Anatomy, Dental Histology, and Dental Technics in the Pennsylvania College of Dental Surgery. Philadelphia, P. Blakiston's Son & Co., 1898.

An advance copy of this work comes to us just as we go to press, so that an extended notice cannot be prepared for this issue. The general appearance of the work is attractive, the illustrations are exceptionally fine, and it is a good specimen of book-making. A full review will appear in the December DENTAL COSMOS.

Information for Dentist and Patient. A magazine for the reception-room table. Published monthly by L. P. Bethel, Kent, Ohio. Subscription price, $1.00 per year.

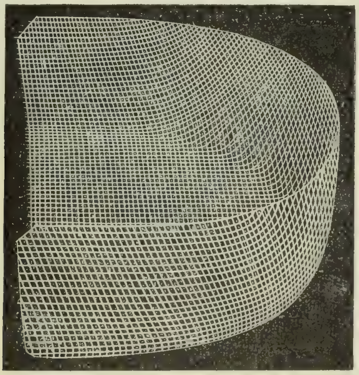
The first number of this new magazine is fully up to the promises held out as to its character. We are strongly of the belief that a periodical conducted along the lines upon which this one is projected will be productive of incalculable good by disseminating trustworthy information upon dental matters among a class of people who will be much benefited by it.

The problem of educating the public on dental subjects will be practically disposed of if liberal support is given to Dr. Bethel's enterprise by securing a wide distribution of his magazine. It is in the right hands, and deserves success.

# HINTS, QUERIES, AND COMMENTS.

Teeth Investments.—The investment of porcelain teeth, for their protection and positional maintenance during the process of backing and plate or bridge soldering, has hitherto been attended with some difficulties, which the writer has sought to overcome. As a means to that end, the provision and employment of suitably shaped frames of woven wire, or gauze, was originated. Fig. 1 shows a one-half-sized frame of iron wire gauze of about No. 24 mesh, adapted for the investment of a full upper denture; and Fig. 2 exhibits such a metal plate and backed teeth invested preparatory to soldering.

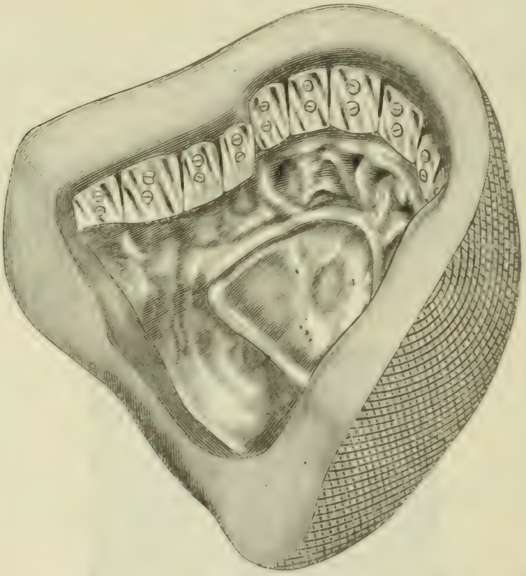
Fig. 1.



The advantages of the gauze frames are:

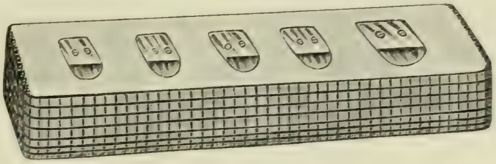
First, the ease with which by shears, pliers, and fingers they may be conformed to the size and shape of the piece to be invested, whether it be, as in this instance a full upper vaulted plate, or a partial, or bridge denture. Second, the facility with which the investment may be made by pouring some batter into the frame, some upon the under side of the plate and over the faces of the teeth, and then setting the piece in the frame so that the teeth will be about one-eighth of an inch from the frame wall, and nearly on a level with the wall-edge. The completion of the investment by covering the porcelain surfaces beyond the backings, packing and smoothing the rear contents of the frame (covering when desired the vault portion of the plate nearly to the solder line, as defined by the carefully shaped wall of the fixing wax which supports the backings), will take but a few minutes. The result is apparent in Fig. 2; it being assumed that in this illustrated case a preliminary sectional plaster investment of the teeth faces had allowed the fitting and riveting of the backings, to be followed by a renewal of the fixing wax and the removal of the plaster sections. Third, the mass of the invested piece and frame has much less bulk than is common, and consequently it, fourth, dries sooner, and, fifth, may be brought to a soldering heat in less time, besides being, sixth, much more safely and readily handled when heated, by reason of the protective frame, which guards the investment, while, seventh, the heat conductivity of the iron wire hastens the heating up of the mass to near the solder-flowing point. Eighth, if the investment cracks under the heat, the frame will hold the parts together, yet when a non-cracking investment is used the frame, ninth, surprisingly maintains its form, and seems to wholly prevent contraction of the soldered plate or bridge. Tenth, the frames are usable for several investments before yielding to the oxidizing action of the heat. The frame shown in Fig. 1 may be quickly cut and shaped to serve for smaller or partial cases.

FIG. 2.



For single teeth or crown investments, or for backing a set of fronts, or an entire set, one may easily and rapidly shape a parallelogram of gauze, cutting say half-inch long slits near the four corners, and bending the sides and ends to form a box-like frame, into which the thick-mixed batter may be put and the backed teeth be pressed in, as seen in Fig. 3. Such framed gauze investments may be quickly made, easily handled, immediately dried (for the meshes allow rapid evaporation), while the conductive wire hastens the heating to the soldering temperature. Other illustrative examples of the use of the wire gauze frames for lower dentures and for bridge-work could readily be instanced, but these will suffice for an intelligible exposition of this most modern means for expediting and perfecting the investment processes, and for the attainment of the best results. It may be well, however, to describe a yet simpler method of procedure, when the wire gauze is not at hand.

FIG. 3.



A strip of sheet lead about No. 17 thick, and three-fourths of an inch wide, is bent in hoop-shape to conform to the outline of the denture at about an eighth of an inch distance outside the teeth surfaces. The ends of the strip should lap at the rear of the denture, and be narrowed to about one-fourth inch, to be pinched or wired, to maintain the shape of the hoop. The hoop may then be placed upon a sheet of tin or lead foil, and be partly filled with the batter, which is also put onto the under side of the plate and over the outer surfaces of the teeth, that are then to be placed within the hoop at about an eighth-inch distant. Additional batter to cover the teeth tops will complete the investment. As soon as this has set, the hoop, by its ends, may be bent from the walls, and the foil peeled from the bottom to disclose a neatly-formed casing, which, by a very little trimming, will result in a relatively small investment, adapted for more convenient, safe and speedy subjection to the drying, heating up, and soldering process than is usual with common, bulky, and ill-shaped investments.—W. STORER HOW, D.D.S., Philadelphia, Pa.

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## LIST OF UNITED STATES PATENTS

### PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING SEPTEMBER, 1898.

*September 6.*—No. 610,214, to JOHN D. WILKENS. Dental engine.
" " No. 610,483, to CHAS. P. FRITZ. Tool-holder for dental hand-pieces.
" *13.*—No. 610,518, to HENRY BAUSCH. Mouth and throat mirror.
" " No. 610,775, to WM. S. THOMPSON, JR. Tooth-powder receptacle.
" " No. 610,840, to EDW. H. ANGLE. Dental pliers.
" *20.*—No. 611,185, to CHARLES H. RICHARDSON and LEWIS MCMAKIN. Rheostat.
" " No. 610,987, to LOREN E. HENDRICKSON and CHAS. H. READ. File and saw carrier.
" " No. 611,218, to GEO. E. JOHNSON. Dental cuspidor.
" *27.*—No. 611,531, to JOHN W. TENNY and RALPH T. MCCRACKEN. Dental plugger.
" " No. 11,696 (Reissue), to FRANK HURLBUT. Dental spittoon.

# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

**Barrett** (W. C.) Oral pathology and practice. A text-book for the use of students, etc. Phila., 1898, S. S. White Dental Mfg. Co., 239 p. 8°.

**Burchard** (Henry H.) A text-book of dental pathology and therapeutics, including pharmacology. Phila. & N. Y., 1898, Lea Brothers & Co., 587 p., 1 pl. 8°.

**Guilford** (S. H.) Orthodontia, malposition of the human teeth, its prevention and remedy. 3. ed. Phila., 1898, T. C. Davis & Son, 254 p. 8°.

**Guillon** (Emile.) Contribution a l'étude des abcès chroniques et ankystés amygdaliens et périamygdaliens. Lyon, 1898, 86 p. 8°. No. 143.*

**Jourdanet** (Paul.) De la dysphagie douloureuse prolongée dans le diagnostic de la syphilis de l'arrière-gorge aux trois périodes. Lyon, 1898, 77 p. 8°. No. 133.*

**Morton** (William James.) Cataphoresis or electric medica-mental diffusion. N. Y., 1898, American Technical Book Co., 273 p., 1 pl. 8°.

**Ames** (W. V-B.) Cataphoresis (electrolysis). Dental Cosmos, Phila., 1898, xl, 615–620.—**Andresen** (V.) Die Querstreifung des Dentins. Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 386–389.—**Angle** (E. H.) Double resection of the lower maxilla. Dental Cosmos, Phila., 1898, xl, 635–638.—**Arnold** (O.) Aseptic precautions in dentistry. Ohio Dent. J., Toledo, 1898, xviii, 424–426—**Atkinson** (D. D.) Abscess upon teeth with living pulps. Am. Dent. Weekly, Atlanta, 1898, i, 605–607. ——— The lance in first dentition. *Ibid*.: 618.—**Bardach** (H.) Ein Beitrag zur Lehre von der Wurzelfüllung. J. f. Zahnheilk., Berl., 1898, xiii, nos. 29 & 30.—**Barrows** (W. A.) Oral hygiene and mouth-washes. Dental Cosmos, Phila., 1898, xl, 628–632.—**Bennett** (F. J.) The ending and mending of caries. J. Brit. Dent. Ass., Lond., 1898, xix, 601–607.—**Bennett** (S.) Erosion. *Ibid*.: 615–617.—**Bericht** über die Verhandlungen der 37. Jahresversammlung des Central-Vereins Deutscher Zahnärtze am 5. und 6. August 1898 in Eisenach, im Gewerbehause. Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 390–417.—**Blanc** (A.) Papillome de la langue en transformation épitheliale maligne. Marseille méd., 1898, xxxv, 521–524 —**Blish** (J. L.) A saliva ejector. Items Interest, N. Y., 1898, xx, 656.—**Bonwill** (S. W.) Dentistry in Burmah. Dental Brief, Phila., 1898–9, iii, 61–65.—**Brackett** (C. A.) The first meeting with patients. Internat. Dent. J., Phila., 1898, xix, 582–586.—**Broomell** (I. N.) The histology of cementum. Dental Cosmos, Phila., 1898, xl, 697–723.—**Bruck** (W.) Die Herstellung der Nasenprothese durch den Zahnarzt. Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 377–385.—**Burchard** (H. H.) The architecture of the human teeth. Dental Cosmos, Phila., 1898, xl, 605–615.—**Cahlo** (H. C.) Filling with gold. Dental Brief, Phila., 1898–9, iii, 67–69.—**Carmody** (T. E.) Bacteriology. Dental Reg., Cincin., 1898, lii, 401–412.—**Christ**. Aerztliche Leitung von Narkosen bei Nichtapprobirten. Deutsche Zahnärztl. Wchnschr., Wiesb., 1898, i, 128–130.—**Chupein** (T. F.) Reminiscences; a personal contribution to the history of dentistry. Dental Office & Lab., Phila., 1898, xii, 130–139. ——— The amalgam question. *Ibid*.: 139–144.—**Cohn** (J.) Pulsirender apicaler Abscess. Deutsche Zahnärztl. Wchnschr., Wiesb., 1898, i, 127.—**Cohn** (K.) Die Feststellung der Bisshöhe bei künstlichen Gebissen. *Ibid*.: 13. ——— Forderung der Muturität als Vorbedingung zum Studium der Zahnheilkunde. *Ibid*.: 101; 113.—**Coley** (W. B.) Partial excision of the lower jaw for sarcoma. Ann. Surg., Phila., 1898, xxviii, 383.—**Davenport** (S. E.) Some properties of vulcanite rubber. Internat. Dent. J., Phila., 1898, xix, 579–582.—**Death** from pyæmia following attempt at tooth extraction. Dental Rec., Lond., 1898, xviii, 359.—**Deubel**. Traitement de la leucoplasie buccale. Répert de thérap., Par., 1898, xv, 594.—**Deyrolle** (E.) Traitement chirurgical du noma. Gaz. hebd. de méd., Par., 1898, n. s., iii, 820–822.—**Diederichs** (K.) Praktische Mikroskopie. Zahnkunst, Leipz., 1898, ii, nos. 34; 35.—**Essig** (J.) Relaciones higiénicas y cuidados de las dentaduras artificiales. Correo Internac. Odont., Madrid, 1897–8, iii, 1168–1172.—**Falero** (J.) Gingivite phagéodénique contagieuse. Progrès dent., Par., 1898, xxv, 273–276.—**Field** (F. H.) The best way to open a tube of pyrozone. Items Interest, N. Y., 1898, xx, 655.—**Fillebrown** (T.) Secondary operation for harelip. Internat. Dent. J., Phila., 1898, xix, 565–567.—**Formel** (A. A.) Mysterious hemorrhages. Items Interest, N. Y., 1898, xx, 661.—**Foster**

(M. W.) The toxic effect of cocain, induced through cataphoresis, applied to a pulp preparatory to its removal. Dental Cosmos, Phila., 1898, xl, 739–742.—**Fowler** (A. A.) Paraform and its uses. Pacific Med.-Dent. Gaz., San Fran., 1898, vi, 429–431.—**Freemantle** (F. E.) Death under A. C. E. Guy's Hosp. Gaz., Lond., 1898, xii, 373.—**von Friedländer** (F.) Beitrag zur Kenntniss der myogenen Kieferklemme. Wien. klin. Wchnschr., 1898, xi, 461–463.—**Frohmann** (D.) Zur Symptomatologie und Diagnose des acuten, nicht eitrigen Katarrhs der Kieferhöhle. Deutsche Zahnärztl. Wchnschr., Wiesb., 1898, i, 199.—**Gallet**. Ablation des tumeurs du pharynx et du retro-pharynx par la voie inter-thyromaxillaire. Soc. roy. d. sc. méd. et nat. de Brux. Bull., 1898, lvi, 55–57.—**Garcia Diaz** (F.) Fístula salival en un mascador de betel. Siglo méd., Madrid, 1898, xlv, 546.—**Gaston.** Papillome muqueux bénin de la lèvre inférieure. Bull. Soc. franç. de dermat. et syph., Par., 1898, ix, 296.—**Goddar** (C. I.) Dentaduras de aluminio fundido y de metales fusibles. Correo Internac. Odont., Madrid, 1897–8, iii, 1173–1177.—**Goris**. Sur un cas de transplantation du canal de Sténon pour fistule récidivante. Ann. Soc. belge de chir., Brux., 1898–9, vi, 290.—**Grant** (J. W.) Needless extraction of teeth. Items Interest, N. Y., 1898, xx, 659.—**Guy** (W.) Gas and ether. Dental Rec., Lond., 1898, xviii, 352–357.—**Hanaford** (M. L.) The preparation of cavities. Dental Rev., Chicago, 1898, xii, 677–684.—**Harlan** (A. W.) Pyorrhea alveolaris; with some notes from the practice of the author. Indiana Dent. J., Indianap., 1898, i, 869–875.—**Hart** (A. C.) A report on microscopy. Pacific Med.-Dent. Gaz., San Fran., 1898, vi, 419–429.—**Heckard** (W. A.) A tube-dowel crown. Indiana Dent. J., Indianap., 1898, i. 833–835.—**Heitmüller** (K.) Die Ausbildung der Zahnärzte. Deutsche Zahnärztl. Wchnschr., Wiesb., 1898, i, 21; 32; 61.—**Hilliard** (H.) A method of prolonging nitrous oxid anesthesia in dental practice. Indiana Dent. J., Indianap., 1898, i, 857–864.—**Horrocks** (F. W.) The antrum and its diseases. Brit. J. Dent. Sc., Lond., 1898, xli, 730–739.—**Humby** (W. R.) Amalgam. *Ibid:* 721–730.—**Husband** (R. J.) Our responsibility for the future of dentistry in Ontario. Dominion Dent. J., Toronto, 1898, x, 281–286.—**Jeffery** (L.) Un cas de prognathisme des incisives supérieures et leur redressement au moyen de l'appareil d'angle. Odontologie, Par., 1898, 2. s., vii, 122–124, 1 pl.—**Jenkins** (N. S.) Porcelain enamel inlays. Dental Cosmos, Phila., 1898, xl, 633–635. ——— Porcelain enamel for inlays and pivot teeth. Dental Rec., Lond., 1898, xviii, 345–352.—**Jesionek** (A.) Ein Fall von Stomatitis gonorrhoica. Deutsches Arch. f. klin. Med., Leipz., 1898, lxi, 91–117.—**Jessen**. Die Verwendung des Orthoform in der Zahnheilkunde. Deutsche Zahnärztl. Wchnschr., Wiesb., 1898, i, 99–101. ——— Pulpabehandlung mit Formaldehyd. *Ibid:* 111.—**Johnson** (A. B.) Malgaigne's operation for epithelioma of the lip. Ann. Surg., Phila., 1898, xxviii, 381–383.—**Johnson** (C. N.) The past, present and future of the profession in Ontario. Dominion Dent. J., Toronto, 1898, x, 287–291. ——— A few considerations in filling teeth. Dental Cosmos, Phila., 1898, xl, 723–734.—**Keiser** (O. A.) Cast aluminum. Items Interest, N. Y., 1898, xx, 655.—**Kelynack** (T. N.) Death from impaction of meat in the pharynx. Med. Press & Circ., Lond., 1898, n. s., lxvi, 238.—**Killian** (J.) Zur Pathologie des Ductus lingualis. München. med. Wchnschr., 1898, xlv, 1143–1145.—**Kingsley** (N. W.) Gold not the ideal filling. Items Interest, N. Y., 1898, xx, 651–653.—**Kirchner** (G.) Leucoplakia oris. Deutsche Zahnärztl. Wchnschr., Wiesb., 1898, i, 179–182.—**Kirk** (E. C.) Abscess upon teeth with living pulps. Dental Cosmos, Phila., 1898, xl, 621–628.—**Knight** (W.) Some remarks regarding various affections of the temporo-maxillary articulation. Dental Reg., Cincin., 1898, lii, 322–333.—**Knowles** (S. E.) A few hints on the management of proximal cavities in molars and bicuspids. Pacific Med.-Dent. Gaz., San Fran., 1898, vi, 393–398.—**Lavisé**. Note sur l'amputation de la langue par la méthode de Whitehead et sur le procédé de Morestin pour l'ablation du rectum cancéreux. Ann. Soc. belge de chir., Brux., 1898–9, vi, 285–289.—**Lederman** (M. B.) Urticaria, involving the soft palate, causing alarming symptoms. Laryngoscope, St. Louis, 1898, v, 153.—**Legrand** (A.) Nouvelle contribution à l'étude de l'eucaïne-β en stomatologie. Nouv. remèdes, Par., 1898, xiv, 337.—**Lockyer** (C.) A case of gangrenous stomatitis; septicæmia; death J. Brit. Dent. Ass., Lond., 1898, xix, 607–611.—**Lundborg** (J. A. W.) Dental prosthesis. Pacific Med.-Dent. Gaz., San Fran., 1898, vi, 398–403.—**McCardie** (W. J.) On the prolongation of nitrous oxide anæsthesia in dental operations, by means of a mouth tube, after Mr. Coxon's method. J. Brit. Dent. Ass., Lond., 1898, xix, 611–615.—**Marie** (A.) Sources de la chaleur animale. Odontologie, Par., 1898, 2. s., vii, 97–115.—**Marshall** (J. A.) Development of dentistry from 1868 to 1898. Dominion Dent. J., Toronto, 1898, x, 273–280.—**Martyn** (G. K.) Stomatitis following the administration of antipyrin. Brit. M. J., Lond., 1898, ii, 807.—**Metcalf** (F. A.) A case of trigeminal neuralgia. Clinique, Chicago, 1898, xix, 479–485.—**Metcalf** (F. H.) Education and its relation to dental ethics. Pacific Med.-Dent. Gaz., San Fran., 1898, vi, 403–418.—**Molnár** (J.) Ein Fall von eiteriger Nekrose des septum interalveolare. Zahnärztl. Wchnschr., Hamb., 1898, xxii, 489.—**Montgomery** (D. W.) Lingua plicata. Pacific Rec. M. & S., San Fran., 1898–9, xiii, 47.—**Mosher** (Eliza M.) The dentist's posture at operating chair. Ohio Dent. J., Toledo, 1898, xviii, 417–420.—

**Neisser** (A.) Lippen-Eczeme und Mundwässer. Deutsche Zahnärztl. Wchnschr., Wiesb., 1898, i, 14.—**Nyman** (J. E.) The ceramic art in dentistry. Dental Rev., Chicago, 1898, xii, 655–677. [Discussion], 712–719.—**Observations** regarding a series of eighty anesthesias by the use of the Schleich mixtures, Nos. 1, 2 & 3. Lehigh Valley M. Mag., Easton, Pa., 1898, ix, 171–173.—**O'Connor** (M. J.) [1861–98.] (Obituary.) Dental Cosmos, Phila., 1898, xl, 790.—**Odenthal.** Die Extraction der ersten bleibenden Molaren bei Kindern im Alter von 12–14 Jahren zur Conservirung der übrigen Zähne. Deutsche Zahnärztl. Wchnschr., Wiesb., 1898, i, 119–122.—**Palmer** (S. B.) The cause of obstruction of pulp and gold crown by amalgam. Ohio Dent. J., Toledo, 1898, xviii, 409–412.—**Partsch.** Ersatz des Unterkiefers nach Resektion. Med. Rundschau, Berl., 1897–8, 249; 257; 267; 287.—**Paterson** (H. J.) The prolongation of nitrous oxid anesthesia. Indiana Dent. J., Indianap., 1898, i, 864–866.—**Perry** (S. G.) Treatment of cervical borders. Internat. Dent. J., Phila., 1898, xix, 567–578.—**Platt** (F. L.) Why we need a better state dental law. Pacific Med.-Dent. Gaz., San Fran., 1898, vi, 377–393.—**Raymond** (F.) **et P. Janet.** Tic de contraction des mâchoires pendant la parole. Rev. gén. de clin. et de thérap., Par., 1898, xii, 529.—**Rees** (F. B.) The mouth a human culture tube. Dental Reg., Cincin., 1898, lii, 306–309.—**Reinhardt** (A. G.) Resume of recent treatment. Ohio Dent. J., Toledo, 1898, xviii, 426–429.—**Reverdin** (J.-L.) **e F. Buscarlet.** Epithélioma de la lèvre supérieure. Rev. méd. de la Suisse Rom., Genève, 1898, xviii, 411–417.—**Richmond** (George P.) [1849–98.] (Obituary.) Dental Cosmos, Phila., 1898, xl, 790.—**Riedmayer** (J.) Der Zahnkünstlerstand und das Gesetz wider den unlauteren Wettbewerb. Zahntech. Rundschau, Berl., 1898, 4761.—**Ritter** (P.) Ueber die Bedeutung einer gesunden Mundhöhle bei den Erkrankungen des Kindes. Deutsche Zahnärztl. Wchnschr., Wiesb., 1898, i, 37; 46.—**Rosenthal** (J. M.) Causes of dental caries and prophylaxis. Indiana Dent. J., Indianap., 1898, i, 835–841.—**Royce** (E. A.) The introduction of gold in large cavities. Dental Rev., Chicago, 1898, xii, 684–687.—**Sangster** (W. A.) Preservation of the dental pulp. Dominion Dent. J., Ontario, 1898, x, 293–295.—**Scheele.** Bromäther-Narkosen und meine Erfahrungen über dieselben. Deutsche Zahnärztl. Wchnschr., Wiesb., 1898, i, 135–139.—**Scheuer** (A.) Dolor post extractionem dentis. Med. Rundschau, Berl., 1897–8, 363.—**Schmid** (H.) Anatomie normale de la dent de sagesse supérieure. Odontologie, Par., 1898, 2. s., vii, 124–128.—**Schnaubelt** (K.) Ein erfreulicher Lichtblick aus Oesterreich. Zahntech. Rundschau, Berl., 1898, 4763; 4783.—**Seitz** (G.) Nochmals zur Standesfrage. Deutsche Zahnärztl. Wchnschr., Weisb., 1898, i, 153. ——— Bericht über einen Fall von akuter Carbol-Vergiftung und dessen Heilung. J. f. Zahnheilk., Berl., 1898, xiii, no. 30.—**Siegfried** (H.) Die Extraction unterer Molarwurzeln. Deutsche Zahnärztl. Wchnschr., Wiesb., 1898, i, 71–74.—**Slawyk.** Ueber das von Koplik als Frühsymptom der Masern beschriebene Schleimhautexanthem. [Abstr.] *Ibid:* 167.—**Smith** (D. C.) Treatment of chronic abscessed teeth. Dominion Dent. J., Toronto, 1898, x, 292.—**Southwick** (Alfred P.) [1826–98.] (Obituary.) Internat. Dent. J., Phila., 1898, xix, 621.—**Sprague** (F. J.) Root canals. Ohio Dent. J., Toledo, 1898, xviii, 421–424.—**Stanley** (C. C.) The reconstruction of the United States army from a dental standpoint. Am. Dent. Weekly, Atlanta, 1898, i, 617.—**Talbot** (E. S.) Irregularities of the dental arch. [Abstr.] Dental Reg., Cincin., 1898, lii, 310–316. ——— Degeneracy, in its relation to deformities of the jaws and irregularities of the teeth. Dental Cosmos, Phila., 1898, xl, 734–739.—**Thilliez** (L.) **et Cochy de Moncan.** Urticaire des muqueuses (conjonctivale, buccale, pharyngée et laryngée, etc.). J. d. sc. méd. de Lille, 1898, ii, 169–173.—**Thompson** (A. H.) The philosophy of tooth forms. [Abstr.] Ohio Dent. J., Toledo, 1898, xviii, 413–415. ——— Dental anatomy. Dental Office & Lab., Phila., 1898, xii, 145–149.—**Tubby** (A. H.) Case of removal of left half of tongue, left submaxillary gland, left anterior pillar of fauces for epithelioma of four months' duration; operation preceded by ligature of lingual artery. Hunterian J., Lond., 1897–8, 80.—**Varley** (L. W.) [Tooth abscessed twelve years ago.] Items Interest, N. Y., 1898, xx, 658. ——— [Of constant pain.] *Ibid:* 658.—**Walkhoff** (O.) Aus einem Beitrag zur zahnärztlichen Unterrichtsfrage. Zahnkunst, Leipz., 1898, ii, no. 36.—**Wedelstaedt** (E. K.) Some mistakes made by Dr. Clapp in the American Text-Book of Operative Dentistry. Items Interest, N. Y., 1898, xx, 641–651.—**Weisse** (F. D.) Manifectations buccales de la syphilis. Progrès dent., Par., 1898, xxv, 263–273.—**Williams** (A. D.) Orthodontia. Dental Reg., Cincin., 1898, lii, 301–306.—**Wilson** (J.) Sarcoma of the soft palate, etc. Lancet, Lond., 1898, ii, 551.—**Wingrave** (W.) A note on the occurrence of cartilaginous and bony nodules of the tonsils. *Ibid:* 750.—**Wirkung** (Ueber die) der arsenigen Säure und des Thymols. Zahnärztl. Wchnschr., Hamb., 1898, xii, 485.—**Wood** (H. T.) Dentistry and dentists in Ontario before 1868. Dominion Dent. J., Toronto, 1898, x, 266–273.—**Znamensky** (N. N.) Ueber die Entstehung der keilförmingen Defekte (erosion) der Zähne. Zahnärztl. Wchnschr., Hamb., 1898, xii, 464; 469; 478; 487.—**Zwillinger** (H.) Praehyoidealis tömlö esete. [Case of praehyoidal cyst.] Orvosi hetil., Budapest, 1898, xlii, 418.

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# ORIGINAL COMMUNICATIONS.

## THE HALF-CAP CROWN.

BY DR. WM. E. CHRISTENSEN, MUNICH, BAVARIA.

(Read before the American Dental Society of Europe's Twenty-fifth Yearly Meeting, London, August, 1898.)

IN the preface of Professor C. J. Essig's "American Text-Book of Prosthetic Dentistry" we find the following statement: "Rarely is any operation in this art an exact repetition of a preceding one, the resemblance which one case bears to another being more often remote than close." I repeat these words, not that they teach us anything new, but, on the contrary, because they indorse a well-known fact. This fact, however, again proves how little to the point are universal rules, which, except for teaching basal or fundamental principles, in daily practice are often of far less importance and utility than their exceptions.

What I call the "half-cap facing crown" is such an exception from the rule, the fundamental principle being the Richmond crown.

The Richmond crown certainly marks an epoch in the progress of prosthetic dentistry, and I bow in reverence to its inventor; yet, in spite of this, I must confess that the true Richmond crowns which I have made during my years of independent practice count but a very small number, for, at the same time that I recognize the superiority of a banded crown, I find in most cases such severe drawbacks to its application that in my opinion only in very rare instances is it good practice to apply a full band to any of the six front teeth.

This may seem a bold statement in these favored days of crown- and bridge-work, for it is always dangerous to attack authority;

and I am aware that the Richmond crown is of such firm standing that it would seem vain to attempt an attack upon it. However, I do not mean to attack the Richmond crown as a mechanical principle, for as such I respect it highly; but it is the differences between theory and practice, the differences between the plaster model and the human mouth, and between drawing a thing on the paper and performing the same thing in the mouth which I beg to call into consideration, and upon which consideration I claim that the Richmond crown in its original shape should not find *universal* application.

Also I make this statement in the faint hope of finding at least a few dental practitioners being of my opinion, for if it were not so, how would the thousands of Logan crowns find their way into people's mouths? Not merely because to apply them is more comfortable practice, I hope.

The worst disadvantages of the Richmond crown are, in my estimation, first, the trimming away of the enamel from the root, without which no accurate fit of a stiff and cylindrical band is possible; second, that altogether too much, in fact, the strongest part of the old tooth, must be trimmed away in order to give place to the new crown, weakening the remaining root to a considerable exent; and, third, that in spite of all trimming the front portion of the band will always, sooner or later, become exposed and come to be seen.

If the tooth to be crowned is one surrounded by loose gum, the trimming away of the enamel and cylindrical shaping of the root is not exactly difficult, but as such a condition of the gum, though not infrequently met with, is not normal, and may almost be considered pathological, such cases can only be ranged under further exceptions. If, on the other hand, we have to deal with normal, sound, and hard gums, if the patient is even comparatively young and one who in laughing and talking brings the gum in view, the breaking away of the enamel under the gum and cylindrical shaping of the root becomes exceedingly difficult and very uncertain of a good result. All the instruments I know of for this manipulation are unfit to do the work well, especially the "How's rotating root-reducers" I find absolutely impossible; the result of using them is ordinarily that of rendering a sound and healthy gingival margin into a torn and bloody mass; the fit of the band underneath is, at the best, questionable, and the patient is ill-treated and badly served.

It is, no doubt, in recognition of these facts that Logan crowns are so often resorted to, in spite of the disadvantages which this crown also has. The weak points of the Logan crown restoration lie chiefly in the root. That the joint between crown and root is not covered up with a band is in itself not important, since a close fit between the base and the root is not difficult to obtain; and when the joint is under the gum-margin, as it ought to be, I do not believe that the cement washes out, which, in any case, can be obviated in using gutta-percha. But as the joint *must* be under the gum-margin, the root also must be trimmed deeply on both sides, so that in most cases we trim away the thickest and strongest portion of the tooth or root, leaving but a weak protection to retain the pivot and stand the entire force of the bite and mastication. As there is no band to encircle the root, the pivot then works as a lever, by a normal bite acting from the center upon the buccal half of the root (Fig. 1, *a*, *b*), resulting sooner or later in splitting the root. There are other drawbacks to the Logan crown, consisting, for one thing, in their shape, which make them especially unfit for low bites, etc.; but these have no direct bearing upon the subject of this paper.

Having, however, pointed out the main disadvantages of the Richmond and the Logan crowns, I now come to what I call the "half-cap facing crown," which is, so to say, "the truth that lies in the middle." Certainly it does away with all of the disadvantages referred to; *it incloses the root and strengthens it better than a Richmond crown, and it looks as well as a Logan crown.* Moreover, as the root need only be trimmed deeply on the buccal side, the root is left stronger; beside that, there is no need of removing the enamel.

FIG. 1.

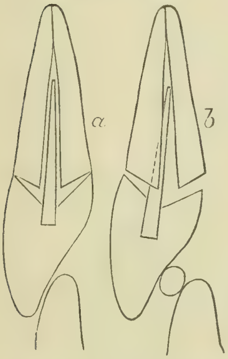


FIG. 2.

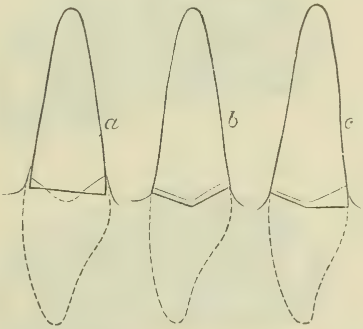
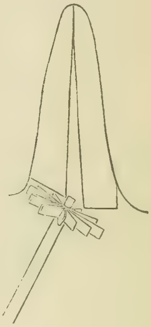


FIG. 3.



Suppose we prepare the same tooth (Fig. 2) to receive (*a*) a Richmond, (*b*) a Logan, (*c*) a half-cap crown; the drawings show at once that for the last crown the root is left larger and stronger than for the two former, for on the palatal side this root can be left projecting from the gum considerably, and on all the six front teeth this portion is the thickest and strongest portion of the whole tooth. The futility of removing the enamel lies in the fact that only the projecting (palatal) portion is to be inclosed in a cap, the *half-ring* of which can easily be adapted to the natural shape of the root. The desired shape of the root is then easily and quickly obtained in using Dr. Ottolengui's root-facers (Fig. 3), with which the root can be cut under the gum-margin (labial side) without at all molesting the gum. The next step in making a half-cap facing crown is to prepare the root-canal for the pivot exactly as in making a Richmond crown; then a band is cut and bent with a pair of round pliers into a half-ring a little narrower than the circle of the root, using 22 k. gold plate, gauge 30 or 32. This half-band is easily slipped in between the root and the gum on the palatal side of the root, where it keeps itself in position while a plaster impression is taken. The plaster impression secures at once the position of the pivot and the half-band (Fig. 4), and when cast furnishes a model on which the crown can be finished (Fig. 5). When the impression has been cast the pivot as well as the band can at will be removed and replaced on the model. For this purpose, however, it is well before casting to float a little wax over the inside of the band. The half-band is then cut in line with the root, and a floor is soldered over it, as on the full cap of the Richmond crown (Fig. 6). Then the half-cap and the pivot are soldered together, after the proper position has first been secured on the model with hard

FIG. 4.

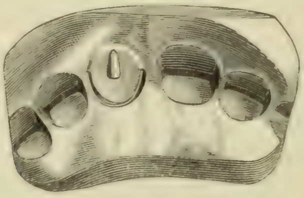


FIG. 5.

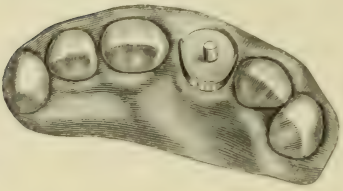


FIG. 6.

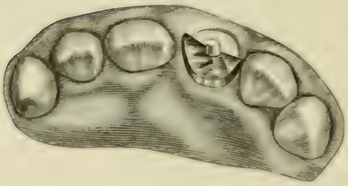


FIG. 7.

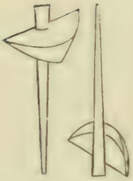
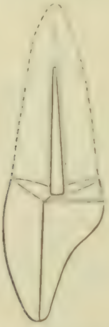


FIG. 8.



wax. The ready base will then look like Fig. 7. The facing is then ground and fitted to the root, as well as to the half-cap and pivot; the parts are secured with wax and soldered like a Richmond crown, or it may be baked with porcelain, like a Downie crown; in which case, however, the cap and pivot must have been made in platinum and soldered with pure gold. The finished crown then looks like Fig. 8.

It would seem as if a half-band or ring made of straight, stiff plate and simply slipped between the root and the gum could not fit closely to the convex and ball-like shape of this part of the natural tooth; however, it must be remembered that ordinarily the gum covers up the back part of the tooth much more than the front, somewhat like Fig. 9, and the band then need not be pushed up so high as to extend above the convexity; it should rather rest with the edge on the thickest part of the convexity, as shown in Fig. 10. When the band has been properly bent with round pliers to fit the curve of the root, all that is to be done is to slip it in place; the gum will not only hold it while the impression is taken, but it even guides it into its proper position. If, for example, we take a straight band like Fig. 11, *a*, it will usually slip in and fit under the gum-margin, as shown in Fig. 11, *b*. What extends over the root should not be trimmed away until the impression has been taken, and this in turn been cast in plaster.

FIG 9.

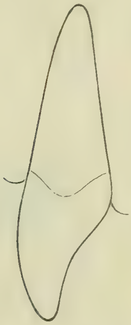


FIG. 10.

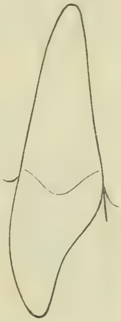


FIG. 11.

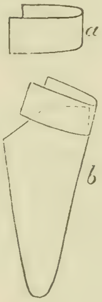
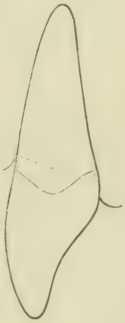


FIG. 12.



The crown, as said before, can be entirely finished on the plaster model; however, if we want to be sure as to the cap fitting perfectly upon the root it is well to try it on the root in the mouth, after the cap and the pivot have been soldered together. To this purpose float a little soft wax in the cap, and press it home on the root in the mouth; the impression obtained will at once show whether the band fits closely or not; if the edge of the band should be found to extend from the root, the band can easily be cut open in the middle with a pair of small plate scissors and be burnished close to the root, after which the edges of the cut will overlap each other a little, and can be soldered together with the final soldering.

If the root to be crowned is one very much gone, perhaps decayed under the gum and exhibiting no preservable zone of enamel, I would not recommend this kind of a crown, but would prefer a full band or Richmond crown; but if any portion of the palatal half of the tooth is left over the edge of the gum, and fit for being preserved, I claim that this furnishes a very important attachment for the new crown, and that the half-cap facing crown will be far superior to a Richmond or Logan crown. Many of the teeth we cut off for crowning have before had fillings put in at the labial gum-margin, extending, in fact, far under the gum and obliging us, if we want to make a Richmond crown, to cut the entire root deeply under the gum; also where recession of the gum has taken place, the proportion of the palatal and buccal or labial gum will often be found to be as shown in Fig. 12. In such cases, and also when the front half of a bicuspid has split off perhaps far under the gum, the half-cap crown will certainly give both operator and patient the greatest satisfaction.

FIG. 13.

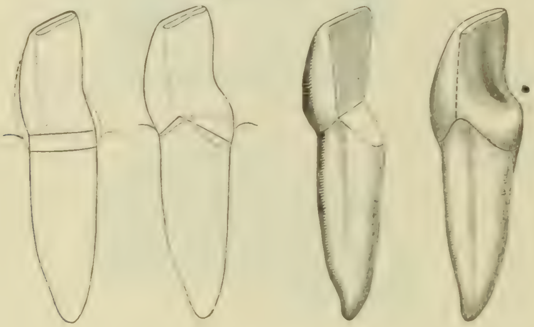
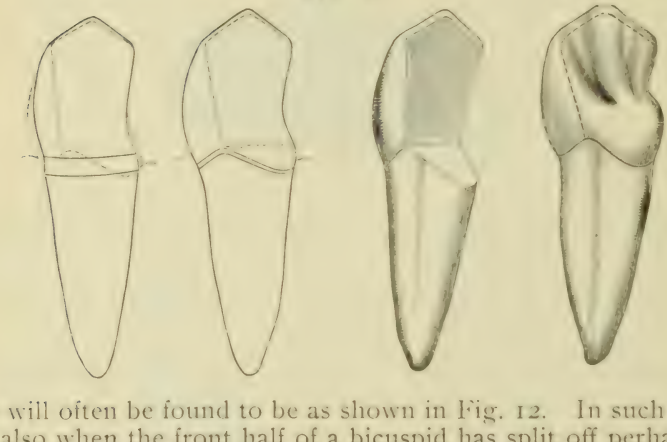


FIG. 14.



Before closing, I want to say that while yet a student my very first attempts at making Richmond crowns suggested to me this, in my opinion, improved kind of crown, an opinion which practice and experience has fully confirmed. Later, whenever I spoke of it to other dentists, I found many who admitted their opinion about the Richmond crown to be much the same as mine. I even found a few who made half-cap crowns almost as I have here described, but they did it only occasionally; and I have found none who liked to speak their opinion on the subject openly. This fear for authority and for the good opinion of the Richmond crown also made me hesitate for some time; in reality, however, this crown is but a modified improved Richmond crown.

I also want to say that, though this crown suggested itself to me, the idea is most likely the idea of many. I am under the impression that Dr. Evans some five years ago read a paper on a crown not the same yet not unlike mine, I believe, before the First District Dental Society of New York, where it was most favorably received; however, it never secured general adoption, and the latest, otherwise almost complete, work on prosthetic dentistry, edited by Professor C. J. Essig, 1896, does not mention any crown of this kind. This especially decided me to bring up the subject before this meeting, for I consider it of great practical value.

One reason why this crown heretofore was not much known and spoken of was perhaps the fact that it was a "child without a name." Even if a thing is good in itself, it needs a name to be known by as well as men do. "The half-cap facing crown" seems to me a term sufficiently descriptive for this crown, and it is my hope that the crown may find more general recognition by this name, and may, as in my opinion it deserves to, become a more distinct feature in daily dental practice.

This paper was written and read two weeks before the August DENTAL COSMOS reached me, in which is published Dr. Burchard's excellent paper on "The Architecture of the Human Teeth." If the drawings of that paper be considered correct, especially Nos. 1 and 2, A and C, the anatomical and also mechanical incorrectness of the shape and adaptation of the Richmond crown becomes at once apparent.

Without wishing to argue the point further, I simply beg the reader to compare these drawings (Figs. 13, 14) to the same tooth supplied with a Richmond crown or a half-cap facing crown, and then judge for himself.

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# A FEW CONSIDERATIONS IN FILLING TEETH.

BY C. N. JOHNSON, L.D.S., D.D.S., CHICAGO, ILL.

(Continued from page 914.)

## APPROXIMO-OCCLUSAL CAVITIES IN BICUSPIDS AND MOLARS (*Continued*).

*Separating the teeth.*—In those cases where the decay has not progressed very far and where there has been little breaking down of the contact point and consequently no dropping together of the teeth, sufficient space may often be obtained by the separator, the proper use of which has already been indicated. But where any considerable movement of the teeth is necessary it is more safely and comfortably accomplished by gradual wedging. The same system may be employed as was advocated for anterior teeth, with the exception that a more extended use may be made of gutta-percha. This substance, if properly employed, is really the ideal material for separating bicuspids and molars, and its more general use would do much to remove the prejudice existing against having teeth wedged.

It may be used in the following manner: The occlusal wall should be broken down in those cases where it is still standing, and the cavity cleared of *débris* and softened dentin with a few sweeps of a broad spoon excavator. It should then be flooded with an essential oil and the excess wiped out, leaving the cavity walls soaked in the oil. Gutta-percha should then be packed into the cavity and snugly against the approximating tooth, so that pressure may be exerted between this tooth and the axial wall of the cavity. The gutta-percha should be built up sufficiently for the cusp of the opposing tooth to impinge upon it in closing the jaws, and the repeated impact thus resulting will tend to spread the gutta-percha and force the teeth apart. By this method teeth may be separated with very little soreness, it being the rarest exception for a patient ever to complain of this sort of wedge. The process is somewhat slow, but it may be hastened in emergency cases by first applying the separator and lifting the teeth as far apart as practicable before packing the gutta-percha. Ordinarily without the use of the separator the gutta-percha may be left in a week, and if at the end of that time there is not sufficient space, fresh gutta-percha may be added and the case dismissed for another week.

To economize time in the management of these cases, it is well for the operator, on examining a mouth where several fillings are needed, to select these approximal cases at the first sitting and pack gutta-percha in each of them. He may then proceed with the other necessary work in the mouth, and by the time that is completed some of the teeth thus wedged will be found ready to operate upon. The more stubborn cases may be left till the last, and, if necessary, the gutta-percha may be renewed in these as the other operations are under progress.

Where the cavity slopes so rapidly from the axial wall to the cervical margin as to result in a sliding of the gutta-percha into the interproximal space instead of exerting lateral pressure, the cervical wall should be somewhat flattened previous to inserting the wedge. The gutta-percha will then rest on a broad base and will spread under pressure, exerting force in the required direction.

When gutta-percha is used in this way, or when it is employed for sealing medicaments into approximal cavities or for any temporary purpose, it should be so built out buccally and lingually as to impinge on the buccal and lingual festoons of gum to force them back on a level with the gum midway between the teeth. There are two reasons for doing this. It keeps the festoons out of the way during the operation, thus preventing their laceration by files or finishing strips and affording better access to the work, and it also leaves the gum in the best possible condition for reoccupying the interproximal space after the operation. If the festoons are left higher than the gum between the teeth, it results in an inverted arch or pocket into which food may pack, thus retarding the healthy growth of the gum. If the festoons are pressed back so that they are not lacerated and a favorable form is left to the gum after operating, it will be found that the gum will quickly creep back into the space and occupy it in a healthy condition.

## DETAILS OF CAVITY FORMATION.

In those cases where the occlusal wall is still standing and it becomes necessary for the operator to break it down, it is a matter of some importance to know how to do it to the best advantage. The arch of enamel overhanging the cavity at this point is often strongly resistant, and if the attempt is made to crush it in with a chisel, as is frequently done by operators, the result is ordinarily a somewhat severe shock to the patient. This shock, coming in the early stages of the operation, has a tendency to unnerve the patient and create an apprehension which often lasts through the entire sitting. As has already been intimated, all unnecessary violence must be avoided, particularly when the patient first takes the chair.

FIG. 25.

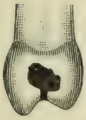

FIG. 26.

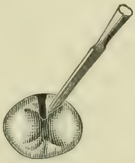

FIG. 27.

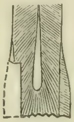

FIG. 28.

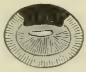

FIG. 29.

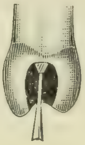

FIG. 30.

To open these cavities comfortably, a slot should be drilled through the arch as illustrated in Fig. 25, which practically removes the keystone of the arch and destroys its main support. If a small sharp drill be used, with the engine revolving rapidly, this slot may be made without appreciable discomfort, and the enamel may then be broken down with a chisel, as shown in Fig. 26. The chisel should be held at the angle indicated and pressed firmly against the enamel to prevent gliding. If the proper angle be maintained, it will require only the slightest tap of the mallet to break the enamel away. Chisels for cleaving enamel should be made keenly sharp, so that they "bite" into the surface immediately at the point where they are held, instead of sliding along the surface with a grating, rasping sensation so distressing to most patients.

After the cavity has been thoroughly opened, the walls may be formed as follows:

*The cervical wall.*—The margin of this wall should be extended far enough rootwise to carry it well under the gum in accordance with the outline in Fig. 16. The degree of extension will differ in different cases. In those teeth where there has been little decay and where the gum fills the interproximal spaces normally to the contact points, it will not require much extension to bring the margin safely under the gum, but in mouths where the gums have receded in the spaces and where the tendency to approximal decay is great, it will call for more extensive cutting to insure a permanent operation.

The form of the wall bucco-lingually should be flat, and it should be made wide enough in this direction to furnish a broad base for the filling to rest upon and to bring the cervico-buccal and cervico-lingual angles to a point of safety against recurrence of decay. The wall should also be flat mesio-distally, and it should join the axial wall at right angles. In some instances, where great security of the filling is required, or where it may seem difficult to start the filling, the wall may be made to dip slightly rootwise as it approaches the axial wall, but a groove should not be drilled along the cervical wall, as is often advocated. To groove this wall results in the formation of a ridge of tissue along the margin of the cavity, against which it is difficult to adapt gold without injuring the enamel.

As the cervical wall joins the buccal or lingual wall it should form a distinct angle in the axial region, but should execute a short curve at the enamel-margin. The angle thus formed in the cervico-linguo-axial corner of the cavity forms an excellent means for securing the first pieces of gold in position, and the general form of the cervical wall when shaped as just outlined affords a base upon which the filling may be built without danger of the gold rocking under the plugger-point. A rounded cervical wall, or in other words a curved base, is responsible for much of the difficulty experienced by some operators in starting these fillings.

The width of the wall mesio-distally must be governed by the extent of tooth-tissue available. The cavity should have as wide a base as possible without endangering the pulp. In this connection the location of the pulp-chamber in the various teeth should be carefully studied by the operator, so that he may judge intelligently how far he can extend his cavities with safety. Fig. 27 illustrates a section of a bicuspid mesio-distally with the form of the cervical wall.

*The buccal and lingual walls.*—As already intimated, the form usually given these walls by operators is to groove them with the idea of anchoring the filling,—the limitations of which method have already been pointed out. There are some cases, it is true, where these walls must be made to sustain the filling; such, for instance, as lower first bicuspids with an exceedingly long buccal cusp and a diminutive lingual cusp joined by a perfect fusion of enamel. In these cases we have no opportunity for creating a step on the occlusal surface, and really little necessity for doing so, owing to the conical shape of the teeth and the consequent limited tipping stress on the filling. The occlusal surface of an approximal filling in one of these teeth presents a sloping surface to the cusp of the upper tooth, and there is practically no leverage to dislodge it. A slight buccal and lingual retention in the form of shallow grooves in connection with a broad, flat seat or cervical wall is all that is required to retain the filling.

But for ordinary cases grooving along these walls should be avoided, though a possible retentive shape should not be ignored in their formation. This may be secured by making an angle between these walls and the axial wall in such a way that the cavity is slightly wider bucco-lingually at the axial wall than it is at the dentinal enamel-margin. (Fig. 28.) This may be done without materially weakening the walls, and the mortise or dovetail form thus provided is an element of security to the filling. This mortised effect should be carried from the cervical wall throughout the length of the buccal and lingual walls till they approach the enamel on the occlusal surface, where they should merge into the form shown in Fig. 17, *c*. This kind of wall presents a surface against which gold may readily be adapted, and the filling-material once locked between these two perpendicular walls is securely held in place. The building of fillings in cavities thus formed is a very simple matter.

*The step.*—This should be cut at right angles with the approximal portion of the cavity, and should present a flat base for the filling-material to rest upon. Its width bucco-lingually and its depth pulpally should be governed by the form of the tooth. If it is a short, thick tooth, the step should be made correspondingly wide, with a diminished depth, while if the tooth be long and thin the step may be narrowed and deepened. The object in any case is to secure a sufficient bulk of filling-material in the step to afford strength,—which is particularly true at the point where the step joins the approximal portion of the cavity. The step should be made as wide and deep here as is practicable without undermining the cusps or weakening the tooth between the cusps so as to render it liable to split. Particular study, especially in bicuspids, should be given to this question of splitting in its relation to the depth of the step pulpally. A safe rule to follow is to drill as deeply between the cusps as the fissure extends pulpally, and make the base of the step at this point. This cannot result in any greater tendency to fracture than existed before, because of the fact that wherever there is a fissure there is no binding strength represented throughout its extent.

The buccal and lingual walls of the step should be made perpendicular, with an angle between them and the pulpal wall. The end of the step most remote from the approximal portion of the cavity should also have a perpendicular form, and the step at this point may often be widened bucco-lingually in those teeth having a notable depression on the occlusal surface at the termination of the fissure. This results in a dovetail form which aids in the retention of the filling.

*The axial wall.*—The shape of this wall will be governed materially by the depth of the decay. Where there is little penetration of the carious process it should be made perpendicular and at right angles with the cervical wall. In cases of deep decay with a concave axial wall it may be well to create a new axial wall with cement, which will afford protection to the pulp and give a better form to the filling. The cement should not be built out so far as to result in leaving the metal filling too thin for strength. Veneer fillings of this character cannot be depended on for extended service. The axial wall should never be left sloping from the step to a narrow cervical wall, on account of the tendency of the filling to shift under stress when built against an inclined surface such as this would present.

*The enamel-margins.*—The buccal and lingual margins should be beveled to a greater extent than in any other part of the outline of the cavity. The cervical margin need be beveled but very little on account of the lack of lateral violence against such a surface, and also because of the difficulty of producing a perfect bevel in this region and building the gold over it. On the occlusal surface the slope of the enamel down to the cavity-margin and the proper shaping of the walls result in a margin which requires very little beveling by the operator. Care must of course be exercised that in forming the margins no overhanging enamel be left. If the slightest ledge of unsupported enamel is allowed to remain, it will quickly be fractured by the stress of mastication.

*Technique.*—In opening the cavity all friable or overhanging enamel should be broken down by chisels, and in this connection some study should be made of the proper angle at which a chisel must be held in order to cleave enamel to the best advantage. Enamel will bear appreciable pressure without fracture if the force is exerted upon it in certain directions, but a slight deviation of the force may be made to result in a ready parting of the enamel-prisms. Advantage should be taken of this characteristic of enamel so that overhanging walls may be broken down with the least possible force. Little can be definitely taught as to the precise angle at which the chisel should be held for the best results in varying cases, but the observant operator will readily learn to detect the vulnerable points in overhanging enamel and know best how to attack it.

The character of the force exerted on the chisel also becomes important. Wherever an angle of enamel is to be broken down or where there is any appreciable bulk of tissue to be cleaved away, it is best and most comfortably accomplished by a sharp, decisive blow of the mallet on the chisel. But where it is merely a question of cavity extension or a trimming of ragged or frail walls, hand pressure on the chisel is preferable. When used in this way care should be exercised not to allow the chisel to slip into the cavity and impinge on sensitive tissue. The hand should be guarded and kept under perfect control by bracing the ends of the fingers—the ones not used in holding the chisel—firmly against the teeth. This work may in certain positions be best accomplished by grasping the chisel in the palm of the hand and allowing the end of the thumb to rest against the teeth as a brace.

The next step is to give form to the cavity-walls. An inverted cone bur of sufficient size to cover the cervical wall mesio-distally should be placed with its end on this wall, as illustrated in Fig. 29, and carried buccally and lingually along the wall till the proper extension is reached. This will give a flat form to the cervical wall and create an angle between it and the axial wall. Care should be exercised that the blades of the bur do not penetrate too close to the pulp. The buccal and lingual walls may often be extended with the same bur by carrying it up and down along these walls,—cutting with the side of the bur. In lower teeth, or in distal cavities difficult of access in upper teeth, an inverted cone bur in the right-angle hand-piece will be most effective. After the walls have been extended with the large bur it will be found that the angles between the buccal and axial or lingual and axial walls, and particularly in the cervico-bucco-axial and cervico-linguo-axial corners, are not sufficiently well defined. A smaller inverted cone bur used in the same way may be carried into these angles to deepen them, and if a still sharper angle be required it can be made with hatchet or hoe excavators.

As the small inverted cone bur is being used along the cervical wall it should be carried laterally somewhat into the buccal and lingual walls at this point and then withdrawn a short distance crownwise along the cervical third of these walls. This will result in an angle or pocket into which the first pieces of gold may readily be secured. Such a form as this is especially serviceable for beginners, who may otherwise find difficulty in starting these fillings. If there be much softened dentin along the axial wall it may be removed with spoon excavators.

In forming the step, the fissure on the occlusal surface may be opened up with a small drill, a suitable form for this purpose being readily made from a worn-out inverted cone bur by grinding it on two sides to a sharp edge, as illustrated in Fig. 30. This form of drill, small in size and ground sharp, may be made to walk directly through between the two plates of enamel bordering a fissure by revolving the engine rapidly and swaying the hand-piece back and forth, so that the sharp corners of the drill effectively bite into the enamel. When a narrow trench is thus made it may be widened with a chisel, after which the floor of the step may be formed with an inverted cone bur stood with its end on the step. This results in the desired flat base to the step, while the sides of the bur give form to the walls.

The cervical enamel-margin may be given the slight degree of bevel necessary with suitably formed chisels or long-shanked excavators. Sometimes in cases of good access a round bur may be passed along this margin to advantage. For beveling the buccal and lingual enamel a thin, sharp chisel may be used to plane down the peripheral margin, but what is far preferable in those cases where it can be used is a sand-paper disk in the engine. This, if held at a definite angle, will give the required bevel, and will leave a margin clearly cut, symmetrical, and smooth. Care must of course be exercised not to round the margin with the disk by swaying the hand-piece as the disk is revolving.

## GENERAL CONSIDERATIONS.

While the form of cavity here recommended is believed to be the best adapted for the majority of cases applying to the dentist, it is acknowledged that there are many instances where it cannot well be followed out in all of its details. The extent of the decay is sometimes so great as to determine the shape of the cavity-walls, and where there has been much undermining of the tissue the operator is left to make the most of the opportunities presented; but the principles involved in cavity formation should never be lost to view, and every cavity should be made to conform to them as accurately as the case will permit.

A distinction is sometimes made in these cavities between those intended for gold and those for amalgam. So far as the general form of the cavity is concerned, there should be no distinction, except that for amalgam more extensive anchorage is usually required than for gold. Gold if properly condensed is so stable and uniform in its behavior that it may be depended on to remain placed in a cavity where amalgam with its freaks and fancies will too often prove insecure. With most of the amalgams in use it requires a much greater bulk of the material to stand a given stress than it does of gold, and the anchorages must therefore be broader and deeper, and the bevel of enamel along the margins not quite so great. With these exceptions the plan of cavity formation should be the same.

One feature relative to the security of these fillings in bicuspids and molars should not be overlooked in estimating the extent of anchorage required. It is too often the case that operators insert these fillings without an adequate study of the kind of service they are destined to perform. Even if they stop to consider the force of mastication in its relation to the extent of anchorage, it is usually only with the idea of a given number of pounds pressure which may be exerted on the filling, and the probability of a certain area of anchorage withstanding such a pressure. They do not consider in its full significance the feature of aggregate service. It is the constant dripping of water which wears away the stone, and in anchoring these fillings we must provide against a series of masticating impacts so numerous in extent as to stagger one who has not studied the matter. Persons vary greatly in the number of occlusions they make during a meal, as they do in the degree of force used in masticating, but a somewhat close observation would lead to the belief that for the proper mastication of an average dinner the individual will make at least one thousand distinct occlusions, and in many instances it will greatly exceed this. Let us stop to consider what this means for our filling. Suppose one-half of these impacts fall on one side and that one-half of these come against the filling. This is really a low estimate, because many persons will manage a bolus of food on each side of the mouth at the same time, and this bolus will extend over several teeth. At a moderate computation each meal will result in nearly three hundred impacts of food against the filling, varying in force and character according to the habit of the individual and the nature of the food. When it is remembered that this process is kept up three times a day for three hundred and sixty-five days in the year, it will soon become manifest that our fillings must be anchored against some pretty severe usage, and, with such a reckoning as this constantly before him, the conscientious operator will proceed to his work with the greatest care and thoroughness to the end that it may be made as permanent as possible.

A close study of the process of mastication in the operator's own mouth in its relation to this subject is strongly recommended. The nature and extent of the force used, together with the manner of its application in the comminution of different food materials, are fit subjects for careful observation; and an intelligent comprehension of the forces at work in the performance of mastication will place the operator in a better position to render the most perfect service.

(To be continued.)

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# PHYSIOLOGY AND DYNAMICS OF TOOTH-MOVEMENT.

BY S. H. GUILFORD, D.D.S., PH.D., PHILADELPHIA, PA.

(Read before the New York Odontological Society, May 17, 1898.)

NONE of us have failed to observe and all of us are willing to concede the wonderful advancement that has been made of recent years in the practice of orthodontia. This is plainly seen in the multiplicity of methods and of appliances that have been devised, as well as in the remarkable results that have been and are being attained in this branch of practice.

Ingenuity and skill combined have enabled us to accomplish what we would not have dared to undertake with any reasonable hope of success twenty years ago. The question, however, arises, "Have we not been devoting too much of our time and talents to the devising of apparatus to correct abnormal conditions and neglecting to carefully study the anatomy and physiology of the parts we are operating upon, and the scientific principles underlying and controlling the forces we employ?" It certainly seems that this has been the case, and that the time has arrived, indeed has long since passed, when more attention should be directed to a careful study of physiological conditions and mechanical principles involved in the correction of irregularities.

To the average practitioner the condition of a tooth in place is that of a hard, strong organ implanted in a bony socket of greater or less density with an intervening membrane uniting the two, and that to change the position of the tooth it is only necessary to apply proper force in the desired direction until the result is attained. It is also generally understood that force improperly applied or controlled may result in certain injuries, such as irritation of the investing membrane, devitalization of the pulp, etc.

As to the changes that take place in the surrounding tissues when a tooth is moved, it is recognized that resorption of the alveolar process takes place on the advancing side, and reproduction of similar hard tissue occurs on the opposite side to fill the space created by the tooth's movement. With this amount of knowledge good results have been obtained in regulating, and the practitioner is often more interested in devising some appliance or method that will shorten the time or lessen the labor of the operation than in trying to understand how and why the movement takes place, and how it is aided or opposed by anatomical peculiarities.

That scientific investigation has not progressed farther in this direction is to be regretted, for the best results in any procedure can only be attained after a full understanding of all the attendant conditions.

As an illustration of this lack of knowledge, I need only remind you of the fact that the average practitioner and most writers upon this subject speak of the alveolar process as though it were an osseous structure of nearly uniform density, thus permitting the inference that one portion of it may be as readily restored or removed as another. Again, there has been great diversity of opinion as to the amount of movement occurring at the apex of the root when force is applied to the crown. At one time it was believed that the apex did not move at all, and later it has been taught that the fulcrum or point of relative immobility of the root in any ordinary movement of the crown was near to but not quite at the apex, and therefore that in such movement while the crown moved in one direction the apex would move in a less degree in the opposite direction. Now, instead of conjecture and controversy upon these and similar points, the real truth might have been arrived at by making some sections through the superior and inferior alveolar processes and carefully studying their peculiarities of structure.

Your essayist was led to do this recently in connection with an investigation into the resultants of various forces applied to the crowns of teeth for the purpose of moving them, and the observations have been so interesting as to induce him to call your attention to them on this occasion, especially as they bear so directly upon the practical operation of tooth-movement.

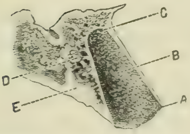
While the alveolar process is at best a temporary structure, it nevertheless possesses the characteristics of other bones in being composed of an inner portion of open cancellate structure, and an outer portion or layer of dense cortical tissue. The relative proportions of these two tissues and their distribution in relation to the roots of the teeth vary greatly in different portions of the arch. In examining a skull we will notice in the incisor region that the outer plate of the alveolar process is exceedingly thin, and conforms so closely to the roots of the teeth as to distinctly outline their form and extent.

This thinness of the plate is due to its being composed almost entirely of the cortex, there being very little cancellate tissue underlying it. Proceeding backward we find this outer plate increasing in thickness to the second and third molars. With the inner or lingual plate it is different. While it is rather thin immediately at the border, it rapidly increases in thickness in the direction of the roots on account of the cortical layer sloping off to form the palate, thus by virtue of its mass and shape creating a veritable buttress for the support of the teeth.

This is well shown in Fig. 1, which represents a section through the superior alveolar process adjoining the median line. B is the alveolus or socket of the central incisor; A to C shows the relative thickness of the cortex composing the external alveolar plate, with very little cancellate tissue underlying it; E represents the thick cortex of the inner plate, not only near the alveolar border but in its continuation to form the palate, while D indicates the large amount of cancellate tissue at the base and inner portion of the alveolus.

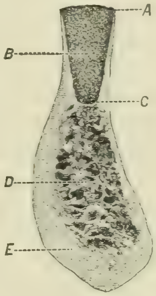
In the lower jaw, there being no palate, the thickness and structure of both external and internal plates in the incisor region are very similar, while posteriorly not only the process in general but the cortex in particular increase greatly in bulk. On the external plate this is due to the presence of the ridge known as the external oblique line, and on the internal to a similar one called the mylohyoid ridge. In the investigation alluded to two features of considerable interest and value revealed themselves. One was the fact that while the cortex closely followed the outlines of the teeth at their necks, it did not pass between them and cover the edges of the septa. The other, that in normal skulls of subjects under twenty years of age, alveolar tissue was often entirely lacking in spots on the labial surfaces of the roots of the incisors, both superior and inferior, and occasionally also over the cuspids. Neither of these latter features had ever before been observed by the writer, nor is he aware that they have been noticed or described by others.

FIG. 1.



Section through superior alveolar process.

FIG. 2.



Section through inferior maxilla.

In the application of force for the movement of teeth they will move with greater or less rapidity and ease according to the character and amount of resistance offered, and the manner of applying the force. If the alveoli in which the teeth are placed were composed entirely of homogeneous structure, that is, all cancellate or all cortical, the resistance offered to the movement of a tooth would be dependent entirely upon the mass of such structure, and we could at least approximately determine how much movement occurred at the apex of the root when power was applied to the crown. Since, however, the root is surrounded by hard tissues of greatly varying density and powers of resistance, the amount of movement at the apex as well as the point about which it moves will depend entirely upon the relative proportions of cancellate and cortical tissue and their location.

As we have seen that these vary in each jaw, and in different portions of the same jaw, certain movements of individual teeth are more readily accomplished than others.

Let us consider some of these movements and see what anatomical conditions present themselves. For the sake of brevity we will omit the consideration of changes in the soft tissues, and confine ourselves entirely to those of osseous structures.

When the crown of a superior incisor is moved outward, resistance to such movement is offered by the thin layer of alveolar tissue on the lower portion of the labial surface of the root, and also by the cancellate tissue on the inner or lingual surface near its apex. The open cancellate tissue being readily broken down by the pressure and resorbed, the root moves in an inward and the crown in an outward direction. As, however, the external alveolar plate is quite thin and composed almost entirely of cortical tissue, which is especially elastic in youth, it bends in response to pressure and allows a still farther anterior movement of the crown. It will thus be seen that by the easy dissolution of tissue on one side of the root, and the yielding of elastic tissue on the opposite side, we have the most favorable conditions for tooth-movement. The inward movement of the same crown is accomplished with greater difficulty, because the conditions are reversed. When the crown is forced backwardly the cervical portion of the root presses upon the inner alveolar plate, which, with its thick cortex, offers very firm resistance. At the same time the upper end of the root moving outwardly is opposed by the external alveolar plate, composed largely of cortical tissue, which cannot bend as readily at that point as at the free alveolar margin. The result is that with so much resistance offered on each side of the root the crown moves slowly and explains the common experience of us all, that a superior incisor is much more readily moved in an outward than in an inward direction.

In very young subjects, and especially where the external alveolar plate may be lacking in continuity (as previously alluded to), the outward movement of the apex of the root will be more noticeable.

In the superior molar region, both alveolar plates are so thick and unyielding that it is doubtful whether they bend to any appreciable extent. The movement of these teeth in an outward direction is probably accomplished only through the slow process of resorption, or by separation of the two halves of the palate at the median suture.

This opening of the palatal suture may easily occur at the age when irregularities are usually corrected, for sutural union is then incomplete. Any great force applied across the superior arch back of the first bicuspid teeth could easily open the posterior portion of the suture without opening the anterior part, and it is quite probable that any extensive widening of the arch posteriorly is brought about in this manner.

The inferior incisors may be moved with nearly equal facility, either in an outward or inward direction, because the amount and character of alveolar tissue on each side of the root is about the same. Fig. 2 shows this condition. In the molar (and partly in the bicuspid) region of the inferior process the teeth are even more immovably fixed than in the superior, owing to the greater thickness and prominence of both alveolar plates. Great force applied to move the lower molars outwardly can accomplish its object only by slow resorption.

The movement of teeth forward or backward in the line of the arch is far more readily accomplished than moving them outwardly or inwardly, and the explanation lies in the fact that there is no dense cortical tissue covering the septa to retard the movement. It also explains the tendency of anchor teeth to change their positions in response to pressure exerted in the line of the arch.

The movement of teeth, like the movement of other bodies, is regulated and controlled by certain general principles or laws, and a proper understanding of such of them as are of importance to us in our work is necessary in order that the required operations may be performed intelligently and in a scientific manner.

To construct a machine which by its action will accomplish a desired result may be easy, but to devise one which will give us the best result without waste of energy or an opposing ill result requires familiarity with the principles upon which it is to operate and the attendant conditions which may limit or control its action.

Three mechanical factors enter into the problem of tooth-movement:

1. Character of resistance to be overcome.
2. Secure anchorage.
3. Proper application of force.

The first has already been treated of.

*Secure Anchorage.*—To secure as stable anchorage as possible we must (1) combine the resistance of several teeth, or (2) arrange to counterbalance the force exerted upon the anchor tooth or teeth in one direction by another force in the opposite direction, thus making these forces compensatory, or (3) obtain an anchorage or resistance at some point outside of the mouth, as on the top or back of the head.

In any proposed movement of a single tooth, either forward or backward in the line of the arch, it has long been customary to select as an anchor tooth one having others adjoining it on the side of the desired resistance. However, even when several teeth thus aided in offering resistance to the force applied, all of them will in certain cases yield somewhat to the pressure and become inclined from their vertical positions, because each one has an independent movement, and frequently the main anchor tooth will be slightly elevated from its socket. Many cases of attempted regulating in this way have resulted in failure, because after the teeth used for resistance have moved and become loose they can no longer be used as an anchorage. The more recent method of joining together two or more teeth by means of united metallic bands (as first suggested by Professor Barrett) does away with the former difficulty, for by this plan no tooth can move independently of the others, nor can any of them be tipped from their vertical positions. Either all of the teeth included in the anchorage will be dragged through the alveolar process in their upright positions, or by their united resistance they will be able to successfully oppose the force applied to them. The latter will naturally be the result. The principle involved is well shown in Fig. 3, where a molar and bicuspid, joined by soldered bands, offer resistance to force applied in the moving of a cuspid.

Another method is to have a plate covering the palate and extending laterally so as to include and cover several anchor teeth on each side. So, also, the wire-crib appliance is used to obtain the combined resistance of several teeth in the moving of others. All of these methods are valuable, and oftentimes one is more available than any other, but none of them furnish the same firm resistance as is secured by the united bands. A vulcanite plate covering the roof of the mouth is very frequently employed as a means of resistance to applied power, because by its infringement upon many teeth the resistance is distributed over a large area and is not great at any one point. It is perhaps the least valuable of all devices for offering resistance, because of its liability to displacement, and yet it may be employed advantageously in certain cases.

When it is desired to move a tooth either outwardly or inwardly into the line of the arch, the resistance to the applied power will usually have to be secured at a point on the opposite side of the arch, and, as in other cases, be obtained by combining the resistance of several teeth.

The second method of securing stationary anchorage, that of opposing a force in one direction by another in the opposite direction, is an extremely valuable one where the conditions are favorable for its employment. A tooth thus used for anchorage will remain stationary provided both forces are equal.

The third plan, that of using the dome of the head, is, in the nature of the case, limited in its applicability, but where it can be utilized it is an ideal method, for it affords an amount of resistance greatly in excess of any possible needs.

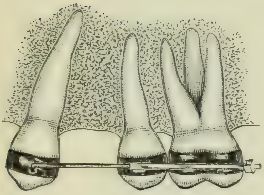
*Proper Application of Force.*—When power is to be applied for the movement of a tooth, attachment for the purpose must be made to some portion of the crown, as that is the only part available. Resistance to such movement is furnished by the alveolus against which the root presses. Somewhere between the place where power is applied and the resistance is manifested we have a point or space where little or no movement occurs. As we thus have a resistance to be overcome, a force exerted to overcome such resistance, and a fulcrum or point of relative immobility, it is evident that the tooth in its movement becomes a lever.

In the ordinary movement of the crown of a tooth, either outward or inward, forward or backward, it operates upon the principle of a lever of the first class, the fulcrum being situated between the power and the resistance.

As, however, the crown to which we apply force is only about one-half the length of the root which offers resistance, we are placed at a disadvantage in having to apply an amount of power far greater than would be necessary if the two portions of the tooth were nearly equal in length.

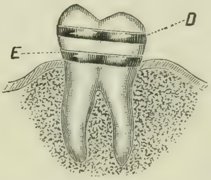
As, however, we cannot change existing conditions, it becomes necessary to apply our force at a point as near the occlusal surface as possible, for by so doing we increase the distance between the power and the fulcrum, thus gaining a mechanical advantage.

FIG. 3.



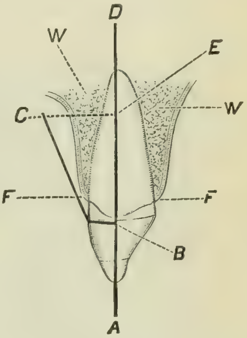
Increased anchorage.

FIG. 4.



Point of greatest resistance.

FIG. 5.



Application of force above the alveolar margin.

So, also, when we desire to use a certain tooth or teeth for anchorage our attachment should be made as near to the cervical margin as possible, for we thus shorten the distance between the power and the fulcrum, and correspondingly lessen the liability of moving the tooth.

In Fig. 4 an attachment for anchorage, made to the band E, will, for the reason just given, accomplish its object far better than if made to a band in the position of D. To move the root of a tooth without changing the position of the incisal edge of the crown has always proven a most difficult operation to perform, on account of the limited area to which we could apply our force.

Professor Case has recently devised a very ingenious method of overcoming this difficulty, for which he deserves the greatest credit. It consists in covering the crown of the tooth with a helmet or wide band, and soldering to this a bar extending upward and outside of the gum in the direction of the root. By holding the occlusal edge of the crown immovably and applying force at the free end of the bar, the root is moved with far greater ease than could be done in any other manner. How force applied at A can operate to greater advantage in moving the root than if applied at B may be understood by reference to the diagram, Fig. 5.

Let A D represent a lever with a fulcrum at F. To this is attached a rigid bent rod, B C. Now, since B D and B C are firmly united, any force applied along B C will be correspondingly felt along B D, for the effect is the same as though B C and B D were united along the line C E.

This is equally true whether we apply force to move the root either in an outward or inward direction. Unless the conditions of the case absolutely demand that the occlusal edge shall not move at all, we can dispense with any appliance for holding it while the root is being moved. Force applied to the end of the bar along the root length will be correspondingly felt by the root itself, and meeting with the resistance of the socket somewhere near the cervix the tooth will move about this fulcrum, and in doing so the crown will be slightly moved in an opposite direction from that in which the root is moving.

In applying force to the teeth it is of the utmost importance to keep it within the bounds necessary to accomplish the desired result. This fact is generally recognized.

If, therefore, this be true, it would also seem to be the part of wisdom to so alter the conditions of the resisting medium as to require less force for the accomplishment of the desired result.

For years we had been disregarding or overlooking the fact that the greatest obstacle we had to contend with in the moving of teeth is the dense, almost unyielding, and very slow resorbing cortical layer of the alveolar plates, and to overcome this we have been exerting more and more force. The tooth could easily be made to force its way through the cancellate tissue beneath but for the firm resistance of the cortical covering. Then why not remove this chief obstacle by a slight surgical operation, thus saving much time and annoyance? It will not be necessary to remove all of the alveolar tissue in the path of the moving tooth, as has been recommended by Talbot and possibly others, for in so doing we would be liable to cause injury to the pericementum. If only the cortical layer be removed the tooth will yield in response to moderate force, and in a very short period of time move into the place designated for it. The amount of real surgery involved is little more than that performed in cases of implantation, and attended with no more risks. Surgical interference has been little attempted, still, owing to its apparent value and its reasonableness, I venture the prediction that at no distant day it will be a recognized method of practice in orthodontia; and when that time comes we will wonder why for so many years we failed to see that it was wiser and more scientific to remove an obstacle easily and quickly than to employ slower and greater force to press it out of the way.

I want to call your attention to a couple of drawings made to represent an operation performed by Dr. Cryer, of Philadelphia. There was a cuspid which had erupted on the hard palate, and he wanted to get it out into line. There was scarcely any mechanical apparatus that would do it, and he used surgical means. He not only cut out the cortical layer, but the cancellate tissue, and gradually moved the tooth out into position. I do not think it could have been moved in any other manner. On one or two occasions I tried the operation myself, and each time I failed.

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# COMBINATION OF AN ENTIRE UNDER SET OF ARTIFICIAL TEETH LIP, AND BEARD.

BY C. H. LAND, L.D.S., DETROIT, MICH.

(Read and exhibited before the Wayne County Medical Society, October, 1898.)

FIGURE 1 represents a denture comprising the full complement of fourteen teeth, including an artificial lip and beard. The teeth and lip are homogeneously composed of porcelain, commonly known in the dental profession as continuous-gum work. The horizontal surface of the lip is enameled flesh color. It will also be observed that the hair of the beard is adjusted close to the brink of the pink enamel, thus providing a very efficient means of obscuring artificiality. From the edge of the lip extending close to the symphysis and laterally to the joint of the natural tissues a countersink was formed in the porcelain body of the denture; into this space an inlay of flesh-colored gutta-percha was impressed, using hot irons to make it plastic and to cause it to adhere. This formed an artificial skin as a base in which to secure the hair of the

FIG. 1.

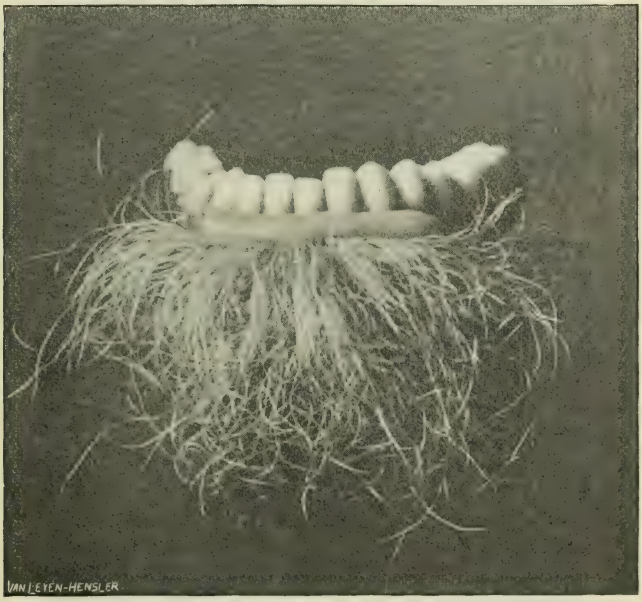


Fig. 2.

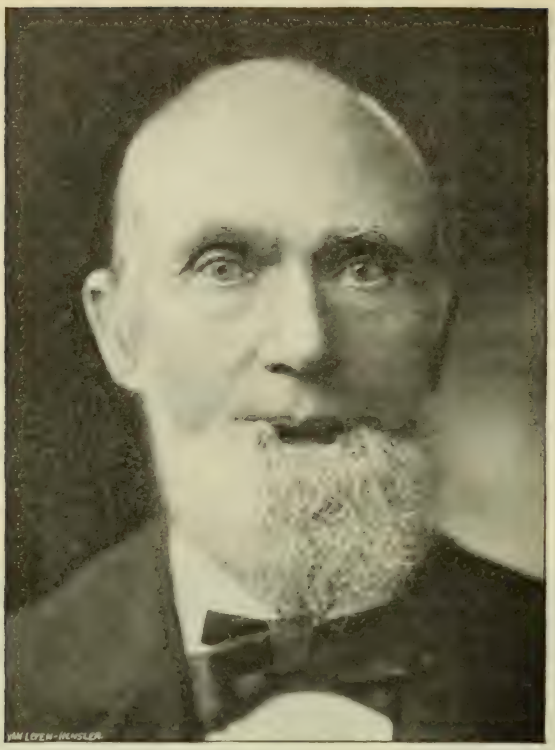
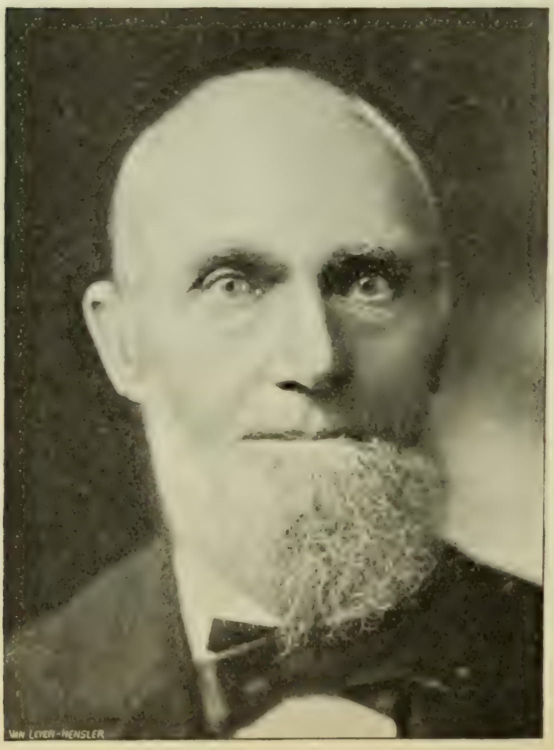


Fig. 3.



beard. In adjusting the latter a solution of flesh-colored chloro-percha proved to be a very reliable cement.

Figs. 2 and 3 represent the subject for which this appliance was constructed, contrasting the difference in appearance. Not the least important feature to be considered in this case is that all words containing *b*, *p*, *w*, *f*, *m*, and *v* cannot be well articulated unless the upper lip can come in contact with the lower. Consequently, here is an instance where dental art has restored masticating power, the means of articulating words properly, and provides a return of the normal expression of the face.

The results have proven to be most satisfactory in every particular. The defect was due to an accident followed by cancer, the removal of the latter leaving the space as shown in Fig. 2.

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# A COMPARISON, WITH SUGGESTIONS.

BY C. W. STAINTON, D.D.S., BUFFALO, N. Y.

(Read before the Eighth District Dental Society, Buffalo, N. Y., April 26, 1898.)

WE are in the habit, in our specialty, of giving ourselves great credit for versatility. I think it was Dr. Norman W. Kingsley who made the assertion some years since that if all other artists were obliterated there was enough artistic ability among dentists to almost restore the "lost arts," and that for its opportunities and age our specialty was richer in nearly everything pertaining to cultivated mind and muscle than any other class of men.

We have enjoyed this flattering view of our own abilities, this praise of ourselves by ourselves (I do not recall ever having heard it much from outsiders), perhaps too much for our own good.

I am not sure we are more apt to overestimate ourselves than any other specialty; indeed, I am inclined to think that we are, all things considered, a really modest class of men. This phrase, "all things considered," is brief, but really comprehensive. While dentistry is in some sense an illustration of the common saying, "There is nothing new under the sun," yet it is so young really in its art, its literature, its educational methods, that many of us, who do not yet consider ourselves old men, have seen it change materially. Its educational methods, much of its literature and practical art, are not yet gray-haired.

While we have great cause to rejoice in what has been done, and look hopefully to the future, it is well to remember that the whole wilderness does not yet blossom as the rose.

In a recent discussion the position was taken that dentists were not only skillful in manipulation beyond other specialists, but as writers and speakers were fully up to the medical and legal professions. Is this true? Let us make a comparison. It will be comparatively easy to defend the position taken as to manual training and skillful manipulation. Abundant illustration might be given along this line. Dentists who have developed along special lines in dentistry, as Coffin, Angle, and Kingsley, or have gone into general or special surgery, as Garretson and others, abundantly prove this. The man who for a generation was the leading surgeon in this locality, Julius F. Miner, commenced as a dentist.

The claim as to our versatility as writers and speakers is much easier to make than to establish. Any one who has served on a committee to provide papers for a dental meeting gets the impression that there are almost no writers. Answers to earnest requests plead "inability," "can't write," "don't know what to write about," "never did such a thing, and never can." That many of the papers we do get, as the result of persistent, forceful persuasion, are written by those unused to writing is very evident. The literary style, or lack of literary style, the self-consciousness proclaimed by the effort, evinces this. "Why your business committee demanded a paper from me on this subject is more than I can tell." "If any apology is needed for my reading a paper before you, I refer you to the business committee, as the fault is theirs, not mine." "Gentlemen, this is my first attempt to write a paper, and if I survive I promise never to plead guilty again." "Mr. President and gentlemen, in the few remarks I have to offer about polishing rubber plates I do not expect to offer anything original, but simply to start a discussion." All these prefixes and suffixes proclaim the neophyte, and are wholly unnecessary. The style proclaims the experience or non-experience of the writer. What is in or is not in the paper leads to the discussion.

Shall we ridicule these efforts of the beginner? By no means. Most of the men in middle life in dentistry have been over this very path, and perspired in the very same way. Certainly some of us recall vividly our own earlier efforts, our shield of "Business Committee," our attempt to say more or less—usually less—about something of which we knew very little, and our vain hope of provoking discussion which did not appear.

No writer is born fully mature. Some there are very versatile, ready to toss off a paper in an hour or two. Such a gift is rare, and not desirable. Why not desirable? Because it is almost certain to lead to verboseness, to very objectionable literary style. Such writers are lacking in carefulness of statement and fixedness of judgment, and are unreliable usually. It is better to write laboriously, to write, rewrite, condense, revise, expressing every idea clearly, concisely, without padding out with phrases not necessary to clearness of expression. This should be the aim and study among us.

We have hosts of writers in dentistry not yet developed. George W. Curtis, one of the most graceful writers we have had, became so from most unpromising beginnings. Illustrations by the score might be given along this line if time permitted. The motto on the title-page of the DENTAL COSMOS, "Observe, compare, reflect, record," carried out thoroughly, would change matters among us in this direction.

We get into a habit of doing things, hear of and see other ways of doing the same thing, but do not fully "observe, compare, reflect," and almost never "record." Consequently we learn new things slowly—perhaps only when we find ourselves in the rear of the procession, and our patients leaving us for other men who are in touch with new and improved methods. The seeker after truth needs ever to keep his mind open and receptive to new ideas and methods. To "observe, compare, and reflect" will help us to do this.

We all take one or more dental journals. Each month these visitors offer to us new things. Unless this new thing is very striking, or strikingly presented, we give it brief attention, and that is all. If we could only apply the first three terms of the motto meeting most of our eyes every month—this rule of three—to what we see and hear, it would quicken our apprehension, broaden our judgment, and improve our manipulation; and then we would be fitted to apply the fourth term of the motto, "record."

To teach men in middle life, and of fixed habits, new methods and habits is not easy. I appeal to every young man who hears me, especially every beginner in dental practice, to keep such record of his cases in practice, of his observation, and of his reading, as will aid his memory. It is not hard to do this. A scrap book does not help us here. The publication of most of our journals in book form, and the desire to keep them for binding, prohibits their mutilation for this method. But we can write a few sentences on paper, giving the name of subject, author, where to find, and such points as strike our minds, and drop it into its alphabetical place in a letter file; or make such entry under the proper letter in an indexed note-book, and be able at any time in a moment to refer to it. Our notes would probably mean nothing to another, but it brings to the man making them the whole article afresh. Such note-book or letter file will cost less than a dollar. The cost is nothing—the trouble is nothing. When the habit is formed the results will be surprising. Any man here who will put this plan into operation can write a good paper for our next annual meeting, for he will have something definite on some subject, and not need to cudgel his empty head all in vain for a starting point.

So much of our training is of the hand, not of the mind, still less of the tongue, that we develop dexterity of the first and neglect the others. Most of the work of our daily practice is *applied mechanics*. The expression of that rare old man in dentistry, Dr. Wm. H. Morgan, in speaking of dental education in the American Dental Association, at Fortress Monroe, in 1894, that "manipulative ability was the keystone of the dental arch," is comprehensive.

It is undoubtedly true that many of our best operators are poor writers and poorer speakers, and that many of our best writers and speakers are sadly deficient as operators. There is no necessary relation between the two conditions. At most, it only shows natural gifts and training in one condition, and lack of them in the other. But lack of them can *always* be atoned for by applied energy. History is full of such instances.

After our examination, before our graduation from Pennsylvania Dental College, Dr. Brophy and myself, with a little time on our hands, were shown by Mr. S. S. White through his establishment, corner Twelfth and Chestnut streets, Philadelphia. On returning to the salesroom we were introduced to a man whom I had seen at a dental meeting in this city, also at Niagara Falls, at a meeting of the American Dental Association. After this gentleman had gone out, Mr. White gave us briefly his history. He was one of the cheapest, most unlearned, untrained men in our calling. Mr. White finally prevailed on him to attend a dental meeting, with the result of opening a new life to him. He got new ideas and new methods of practice, trained himself to write and speak, so that for the last ten or twelve years of his life he was one of the most valuable men in local, state, or national meetings.

The improved standard of dental education ought to improve the conditions we are discussing. Men entering dentistry now must, in most of the states, have the foundation of a fairly good mental training before they can begin their dental education. They are no longer the boys who, with almost no mental training, after some years at the plough, the anvil, or the bench, prompted by a goodly ambition, went into some private office, got what practical training one man could give, under circumstances not most favorable, and then went out to make a record for themselves and for dentistry in general. And this record, in view of all the circumstances and environments, has been a most worthy one. These men, uneducated, untrained in any broad sense, unfavored, have raised us from obscurity and contempt to most gratifying recognition and respectability. All honor to the fathers in dentistry!

Those entering our ranks to-day, favored by liberal, well-appointed preliminary and professional education, with nothing hid from the sincere seeker after new ideas and methods, ought to make great advancement in our special field. Sparsity of thinkers and writers ought soon to be unknown among us.

The third claim, that dentists are as good speakers as members of the medical and legal professions, can hardly be substantiated. Practice makes perfect. Speaking is only incidental among us. This is true also in medicine, but medical men are often called upon to occupy positions at least semi-public in character, and their reading is usually more general than ours. They have a wider field, a longer lineage. In fact, a medical man is the crystallization of the ages. He ought to be a better speaker than the dentist—has a greater repertory and a greater inspiration. I believe medical men of equal rank and position are better speakers and writers than we are.

To claim that we are more at home in consecutive thinking on our feet than the lawyers savors of overweening pride and confidence. A lawyer's training is chiefly of the mind and tongue. Manual training is nothing with him, while with us it is the chief feature. A lawyer's education is that of reading legal enactments and records of cases and decisions, thus filling his mind with legal principles and rules of procedure. His practice is that of applying these principles to practice, and stating and applying them in behalf of his client in open court. Necessarily this makes him ready in speech, quick in retort, and versatile in the application of those rules and principles in support of his own side and in disparagement of his opponent. To expect that a man trained thus will be no more fluent in speech than a man whose time is spent chiefly, not in opening his own mouth, but in opening the mouths of others while he keeps his own shut, seems unreasonable.

Undoubtedly the most fluent impromptu speakers are to be found among the clergy. The best of them will evolve out of their inner consciousness offhand more interesting things to say on a subject given at the moment than any other class of men. And yet the most fluent of them never appear without preparation, if it is possible. Their remarks may seem unpremeditated, but are not. There is only one class of men always on tap, ready to speak without preparation at any time,—viz, the tonguey fellows,—those designated as having the "gift of gab." These are seldom worth listening to, and that leads me to my last suggestion.

We ought to cultivate the habit of getting our ideas on all the subjects given in our programs well in hand before we come together at these gatherings. Then we would listen to papers with minds alive and receptive of all that is of interest; and then we could get up and say something in the discussions, and not be simply human sponges, absorbing all we can and giving out nothing unless we are hard pressed.

## A NEW METHOD FOR AN ALL-PORCELAIN BANDED CROWN.

BY R. W. SWEETSER, D.D.S., NEW YORK, N.Y.

In the field of crown- and bridge-work there is room for a vast amount of improvement. Bridge-work at best is poor in comparison to what it ought to be, and to what we all hope it will be before many years. Crown-work as done at the present time is little better. Perhaps one of the most perfect fitting and permanent crowns generally known to the profession at the present day is the banded, or so-called Richmond crown. There are serious objections to this crown, which often cause its rejection in cases where, but for these disadvantages, it would prove very serviceable. The tendency to fracture of the porcelain facing of a Richmond crown is by no means the last thing to be considered. This of course may be obviated to a greater or less degree by the use of gold cusps on bicuspid teeth, and by reinforcing the cutting-edges of cuspids and incisors in a hundred and one different ways. But this method to many, both operators and patients, is objectionable on account of the display of gold which must ensue in order to give sufficient strength and backing to the porcelain. Having been confronted by these difficulties many times, the writer has to submit to the profession what might be called an all-porcelain banded crown described in this article. First, prepare the root to be crowned as is usually done by grinding to a level with the gum. Then with sharp scaler, or by the use of a chisel, cut away all enamel remaining under the gum, which will trim the root to a shape corresponding to Fig. 1. Next, select a Logan crown for the case as near to the size and conformation of the root as possible, and with proper length of bite and enough to spare to allow for grinding away all of the countersunk portion of the crown. Then grind away this countersink in the porcelain, grinding in a slight but gradual slope in all directions away from the platinum post, so that the crown may have its highest point at the base of the pin. When properly ground the views of the tooth should correspond with Figs. 2 and 3. In picking out a tooth for the case, too great pains cannot be taken in selecting one as near as possible in conformation and size to the circumference of the root. Otherwise the tooth must be ground to conform to the root. Having ground the porcelain surrounding the post as above described, at the same time paying attention to the articulation with the antagonizing tooth, take a piece of gold plate, 24 k., 30 G., and punch a hole to receive the platinum post. Burnish this 24 k. gold carefully and closely to the top of the tooth, and trim to the size of the tooth, filing the overhanging edge always toward the tooth. (By annealing the pure gold in sulfuric acid it will be found to be much more pliable in burnishing to the tooth.) Then invest, and with a small clipping of 22 k. solder attach the pure gold backing, so to speak, to the platinum post. The tooth as prepared thus far and placed in position on the root with articulation should appear as in Fig. 4. A band of 22 k. gold, 29 G., has in the mean time been made and fitted to the root, allowing it to project below the end of the root. Try the crown in with the band fitted and in place on the root, and then trim the band to the length to just meet the backing previously put on the tooth and soldered to the post. Take an impression of the whole in place with marble-dust and plaster, which when drawn away will act also as an investment for flowing a few clippings of 18 k. solder in the crevice formed by the union of the backing and the band. Finish by use of rubber and corundum

FIG. 1.

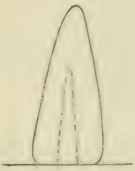


FIG. 2.

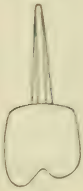


FIG. 3.

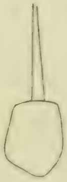
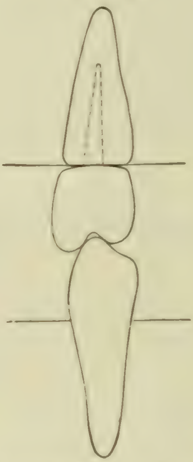


FIG. 4.



disk in engine, and you have a crown with all the advantages of a banded Richmond, but without any gold tips to show and displease one objecting to the sight of gold in the mouth, and a crown in which the chances of fracture are reduced to a minimum.

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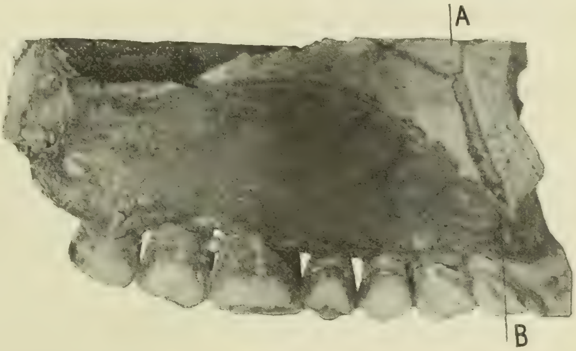
# SURGICAL ANATOMY OF ALVEOLO-DENTAL ABSCESS OPENING INTO THE ANTERIOR NARES.

BY HENRY H. BURCHARD, D.D.S., M.D., PHILADELPHIA, PA.

CASES of chronic alveolo-dental abscess upon central incisor teeth, which vent themselves into the anterior nares and cause a discharge from *one* nostril, simulating that of ozena, are not rare. The cause assigned for the peculiar situation of discharge is undoubtedly the correct one in many or most instances,—viz, the alveolar process is unusually short in some persons and the apices of the roots of central incisors lie unusually close to the nasal floor; in cases of abscess the cancellated bone intervening between root apex and nasal floor offers less resistance to the progress of suppuration than does the outer alveolar wall labially.

A study of the sectional anatomy of these parts reveals another probable cause for this and other peculiar situations of discharge.



An examination of superior maxillary bones which have been drawn away from their bony attachments shows immediately behind the central incisor teeth, and close to them, a series of foramina which transmit the anterior palatine and naso-palatine nerves, which pass forward along the right and left palatal processes from the posterior dental canals lying deep in the mucoperiosteum of the palatal processes. These nerves, entering the foramina, are at least four in number, sometimes more. An examination of the nasal floor will show that these nerves enter that cavity by apparently four foramina. If a section be made (longitudinal) of the palatal process to one side of the median line, it will be observed, as in case figured A, B, that these foramina are openings surrounded by soft, not bony, tissues, and that what are called the anterior palatine canals may be a considerable fossa, lined by a continuation of the periosteum of the nose from above and by a continuation of the maxillary periosteum from beneath. The fossa or canal is continuous across the median line.

This canal lies parallel with the roots of the central incisor teeth, separated from them in a greater or less portion of its length by a comparatively thin layer of bone. It is quite probable, therefore, that an abscess upon the root of either incisor might find discharge into the canals, and ultimately upon the floor of the anterior nares. As the fossa is one without division into right and left halves, abscess upon an incisor of one side might vent in the nares of the opposite side.

The pus, in cases having these anatomical relationships, might pursue the opposite course and find exit at the lower end of the fossa, discharging as abscess upon the central incisor occasionally does immediately behind the incisor teeth. Failing immediate discharge, the pus might dissect along the fibrous tissue of the palatal vault.

It would be interesting to note in such cases, particularly those of long standing, whether any evidences of injury to the nerves contained in the canal arise. A trophic function has been assigned these nerves. At any rate it is certain that they contain vasomotor fibers to the vessels of the anterior nares.

Evidence of their injury would probably be localized atrophic rhinitis in the anterior nares.

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# PROCEEDINGS OF SOCIETIES.

## NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, May 17, 1898, at the New York Academy of Medicine, No. 17 West Forty-third street; the president, Dr. S. G. Perry, in the chair.

### REPORT OF THE CLINIC COMMITTEE.

Dr. J. F. P. HODSON. The clinic was an exceptionally fine one. Dr. John H. Meyer not being present, I will say that his clinical demonstration was the final baking of a full upper continuous-gum set, in which the teeth were also stained to simulate defects, as of wear, age, etc., in such a manner as to produce the most artistic results. This was done by first warming the teeth, coating them with wax which is cut out in places to allow of the etching of the teeth by the use of hydrofluoric acid. In this way any desired unevenness of surface can be obtained. The staining of the teeth to imitate natural discolorations was effected by the use of platinum filings, titanium, and other metallic oxids, mixed with flux in order to fuse at a lower temperature than the teeth. He also baked some small sets of teeth stamped up for him by the Consolidated Dental Manufacturing Company, using their continuous-gum body and enamel to show the density of the material. His next demonstration was the baking of platinum pins, in ordinary pivot teeth, showing with what ease and readiness this combination could be effected. As a matter of experiment he then baked successfully a wire of platinoid in a pivot tooth, using a low-fusing body, the combination of which was made by mixing in the palm of his hand. He also made to a model very short bicuspid and molar porcelain fused crowns, by first fitting and soldering platinum bands, cutting out the face and inserting porcelain facings, the pins of which he spread outward. Without other soldering the facings were baked to the bands and the cusps built up with porcelain, resulting in very nice and serviceable crowns. He also baked a large inlay for a molar tooth, using tissue paper as a matrix. It was surprising how nicely this inlay fitted the cavity. The L. E. Custer Electric Furnaces were used in the above demonstrations.

Dr. Meyer also demonstrated the scientific swaging of metal plates by the use of shot for final perfection of fit. Preliminary to it the plate is swaged on a zinc die and then annealed and placed on the plaster cast, the edges being burnished down to the cast to exclude shot from entering. The lower portion of the swaging apparatus is covered with a layer of mustard-seed shot to the depth of about one inch, upon which is placed the model and plate to be swaged. A layer of shot to cover the plate by about half an inch is poured upon it, and the piston then inserted. Dr. Meyer used a five-pound hammer, and with four hard blows the swaging was accomplished. The accuracy of the result was remarkable in its perfection.

Dr. V. H. JACKSON. I demonstrated my method of making regulating apparatus, including the anchorage with the partial clasps and crib springs, giving special attention to the metals employed, for which I recommend gold, platinoid, and German silver. The spring gold is very applicable, although I am now using the platinoid extensively, often plating the springs with gold after the soldering is done. I recommend that the appliances be plated with the battery, although it is not necessary. The Pohlman solution that has been recommended makes a very beautiful finish on this metal, but the coating is thin and does not wear well. It can, however, be easily regilded. The platinoid is liable to tarnish, but is easily polished with the use of the chalk and brush wheel. The patient, if judicious, can keep the metal from oxidizing.

Much of the time this afternoon was given up to the examination and consideration of cases that have been regulated, showing the condition and position of the teeth before the insertion of the appliance, the application of the appliance that was used, and then the position of the teeth when the regulation was completed, both upper and lower.

Dr. HODSON. Dr. Jackson is exceedingly modest in respect to his clinic. He exhibited from fifty to seventy-five casts. The most interesting and instructive part was that in which for the purpose of demonstration he made a diagnosis from a strange cast, and in our presence constructed the appliance necessary for the correction of the irregularity.

The paper of the evening was then read by Professor S. H. GUILFORD, of Philadelphia, entitled "Physiology and Dynamics of Tooth-Movement."*

## *Discussion.*

Dr. C. A. MARVIN. I did not come prepared to discuss so able a paper, but I cannot fail to express my pleasure at hearing such important things dealt with in such a clear and lucid manner. He has touched upon some of the greatest difficulties we meet in regulating teeth. I have had a great deal of experience in regulating teeth, and I am fully aware of some of the difficulties which have been mentioned.

The first principle which I have always laid down as a basis of operation, and which I have so often spoken of to my patients when they asked me in regard to the age at which operations for regulating should be undertaken, is this: We all realize that it is much easier to change the direction of a moving body than of a stationary body; therefore as long as a tooth is growing and has not yet completed its full growth, and is still moving by the natural growth of the part, it is easy to move it. When it is constantly moving, if you put an obstacle in the way in which it is moving, you can change the direction. That, it seems to me, is a thing we should remember. The moving of the apex of a tooth, which has so often been thought to be impossible, has been alluded to. No doubt you have often met cases where a cuspid has erupted outside of the arch, disfiguring the whole face, and you have perhaps extracted the first bicuspid as the simplest way of getting the cuspid in between the lateral and the second bicuspid to fill out the arch; in doing so you have realized what is afterward seen, that the inclination of the tooth, instead of being toward the center of the mouth, has been backward, changing its position and altering the appearance of the mouth. You then realized how important it would have been had the apex of the tooth been changed with the crown, in order that the inclination of the tooth should be toward the center, instead of straight or backward. I did not know that any attempts had been made in that direction. It seemed to me that the ordinary mechanical principle could be employed there to accomplish this end. If a stationary and rigid fulcrum is created, and pressure is brought upon the end of the tooth, the apex must move in the contrary direction. That is the proper time to correct an irregularity. If we find that moving a tooth from the position in which it is situated when it comes to us will change the inclination of the crown so that it will not be in conformity with the symmetry of the mouth, as it should be, we should construct an appliance which will bring opposite that tooth, as near to the junction of the gum as possible, *a rigid fulcrum*, and then apply a force to the point of the crown, holding it there steadily for no matter how long,—a month or two months,—and we shall find that the apex is moved in a contrary direction. That being done, we can use our appliances to bring it in proper place. There is something we do not do very often—a surgical operation—simple, but dreaded by a patient, because it is painful. It is this: with a long, slim drill cut away the obstructing bone in the proper direction, thus preparing a place for the tooth. Then by bringing the force to bear properly we can change the position of the apex with the crown; then construct an appliance that will hold the tooth in place until it shall be cemented by the new deposit of bony tissue. This can be done. Although it is hard (the crown of a tooth being so much shorter than the root that we find ourselves confronted by the opposing mechanical principle of *a greater difficulty in moving the long end than the short end*), still we *can* accomplish it if we take time. Prepare a rigid fulcrum and place it so that the force can by it be directed where needed, and leave it there as long as necessary. In the case of a cuspid, or any other tooth that is so near the front of the mouth that it can be seen, its inclination is an important matter, and when the direction is materially changed the result is very satisfactory to yourself and to your patient.

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*Printed in full at page 995 of the current number.

I was glad to hear the essayist give an illustration of the last case, of the crown of a tooth being erupted far up in the mouth, and removing the bony structure between, in order to bring it to its proper place, because I have seen one case where a tooth erupted in that way, where an effort was made by one of your operators in New York—a very skillful man—to bring the tooth out into the place it should occupy. It was a long, tedious, painful operation, and when I last heard of it I was told it was progressing favorably. I did not see it, so I cannot say; but I was satisfied at that time, and have been convinced since, particularly by the instance brought forward in the paper to-night, that if the bony structure had been removed between the place where the tooth erupted and the place where it should be, it could have easily been moved to its proper place. Great care must be observed to avoid the movement of the crown faster than the apex, and when it inclines to bring the pressure to bear in the contrary direction. It takes a great deal of time, and while there is a very satisfactory result you never get paid for that. It all looks very well to the parents of the child, and the patient, but they are never willing to pay for the hours of labor, of anxiety, and of thought that the dentist spends in devising the operation that results successfully. But if we are aiming for the good of the patient, we do not look at that, trying everything to bring us nearer to success, regardless of the other consideration, although the other is an important thing, as we all know.

Dr. Atkinson used to say (and the fundamental principle of all his conversation on tooth operations was) that there is no limit to the value of dental operations. A dental operation performed successfully was worth all you could possibly get for it, and you never could get too much. That may be so, in one way of looking at it; but at the same time there is the satisfaction which a dentist receives, apart from the pecuniary compensation. If he has succeeded in remedying a defect and bringing a sightly appearance out of an unsightly one, regularity from irregularity, he sleeps better that night, and he believes that he has done his conscience, his patient, and his profession a grand service, whether he gets paid for it or not. No doubt all of you who have done much in the regulation of teeth recollect how many hours you have spent in labor and study of the hardest kind for which you have never received a copper. Probably that is so in all professions, but it is particularly so with us. Patients rarely realize the benefit we give them.

Dr. J. Bond Littig. I do not know that I can add very much in this direction, as I so nearly concur with Dr. Guilford in his paper. I do not think Dr. Guilford will readily undertake that kind of an operation in moving the anterior teeth backward and forward, nor that he advocates the taking away of the alveolus and risking its restoration, when such simple appliances as we have can move the teeth backward and forward. I scarcely think he means that; but where there is a vast territory of osseous tissue through which we must make the tooth move, then a surgical operation in such a case would be necessary,—for instance, moving the cuspid he spoke of. It is almost impossible to get the absorption through that vast territory without taking some of the osseous tissue away. The efforts I have made in that direction have failed many times. In a case of that kind, where we cut away some of the bone, we could accomplish a good thing; but the movement of teeth anteriorly or posteriorly in the mouth can be done so readily by slight appliances that, as a rule, nothing else is necessary. The alveolus bends, sometimes, I think; otherwise we could not get the results in so short a time, and consequently I think a surgical operation would be rather objectionable.

Dr. R. Ottolengui. I think I may almost claim that this paper is due to me, in explanation of which I must say that when Dr. Case read the paper at Old Point Comfort to which allusion was made, I raised a point in regard to his extension levers, and I was very much gratified to have Dr. Guilford get up, in the discussion which followed, and sustain my position. I was not so much gratified, afterward, to have Dr. Case declare that he was not surprised that I should show such ignorance, but he was surprised that a professor should show such ignorance. Now I must express my surprise that the professor has partially come around to Dr. Case's views, because that leaves me without the support I had at Old Point Comfort, and I had been relying, with some gladness, upon the fact that I had the professor back of me. But it not infrequently happens that when a man makes an assertion, meaning a certain thing, he is not quite comprehended, and the discussion following is made antagonistic to the view which he is supposed to hold and which he did not hold. At Old Point Comfort I had no opportunity of answering Dr. Case, because the discussion wandered over to other things, and the time was cut short. I knew this was to be an echo of Old Point Comfort, and I came with a great deal of pleasure.

Dr. Case had two diagrams at Old Point Comfort, somewhat similar to the last one shown, one of which carried the band about to the gum-line. In the discussion, I claimed, and I think the records will show that I repeat what I said then, that Dr. Case would gain nothing in the long arm over the short one. Dr. Case then undertook to prove to Dr. Guilford and myself, and the rest of the dentists, this very point which Dr. Guilford now admits,—that if the arm is rigid, force applied at point C (Fig. 5, page 1001) would be the same as though it were applied over here [illustrating]. I never disputed that. What I disputed was that in practical work he would not gain anything in the movement of that tooth by extending that lever. In the first place, with all courtesy to Dr. Guilford, I maintain that he is mistaken in placing the fulcrum at F. What is the fulcrum? I take it that it is the point of greatest resistance to the action of the lever, because if it were not, the lever could not be used to move the object which was intended to be moved. Is F the point of greatest resistance? Any person who has attempted to carry the anterior teeth in, and has noticed at the very outset that the gum begins to roll up, will be satisfied that it is not the point of greatest resistance, but that it is the point of least resistance. It moves first. If we look at this diagram we see that that is necessarily true. Here we have an increasing density of bone opposed to the direction in which we desire that these teeth should travel. Is it not natural that any force applied here will first affect that point, and less affect the tissues as we pass up to the apex of the tooth? Consequently I believe that exactly the opposite of Dr. Case's proposition is true, and we gain less in practical work, despite all those beautiful theories. I would like Dr. Guilford to take up that point,—its effect in practical work, and not its theoretical placement.

Another thing we have to remember is not only the medium in which we are working, but also the conical shape of the tooth. I maintain that the higher up we place our force, supposing this lever principle to be correct, the greater would be the tendency to drive the tooth out of its socket. Let us study for a moment the proposition of force entirely along this line. Is it not true that in this chart, if this is a rigid bar which cannot bend (here we have the attachment high up on the tooth and it is supposed to be an immovable arm), will not tension through that bar draw that tooth bodily? The root of a tooth can be moved with the tooth without these extension bars; as long as force which directs the motion is in a given direction, the whole tooth will move along that line. It is not the extension which does Dr. Case's work, but the fact that he holds the lower end of the tooth rigid.

Dr. Marvin touched upon a very pretty point when he spoke of moving bodies. That explains a fact which, being a fact, is well to know. The principle of moving bodies, that we are called upon to treat in the mouth, is shown in the erupting cuspid, which frequently comes in out of its place. If Dr. Marvin's advice be followed, and that tooth is moved as soon as possible, while it is still moving, a retainer will never be needed. As soon as you get it to position, whatever occurs normally in fixing a tooth will fix it there, and unless occlusion drives it out it will remain there.

I think a vulcanite plate is often more useful as a resistance than any other plate in the mouth, for the reason given by Dr. Guilford, that it comes in contact with so many teeth, and, being molded to the teeth, it is better than any swaged plate that can be made; but the trouble is that these plates are difficult to keep in firm position. That can be overcome by ligating the plate to the mouth, and I never found that such plates caused injury to the gum, provided this method be followed: the plate should be ligated to the first bicuspids on each side; when it is put back again it should be ligated to the second bicuspids, and each time it is put in it should be ligated to different teeth, eventually coming back to the first teeth, so that each pair of teeth is used about once a week.

Dr. V. H. JACKSON. The subject has been so thoroughly presented that there is very little to be said, except we take an antagonistic view. The practicability of the models presented is what concerns me most, but their discussion is improper because I would not be discussing the paper before us.

I should both agree and disagree with Dr. Ottolengui in his statement. Regarding the power as applied, in the latter part of his remarks he spoke of the point or apex of the root as being a fixed point, and pressure then being applied to the long arm. That is a correct principle. In general terms it would not matter so much, if a sufficient amount of power be applied, how long the lever is that extends from the collar. If we do not consider the apex a fixed point, it does concern us how long the lever is. For moving the root of the tooth with the crown, I have been using a fixed attachment to the collar, similar to the principle that Dr. Ottolengui described in his latter remarks. More recently I have used a removable attachment that permits the appliance to be disconnected for cleansing.

I have several methods of making that application, but I hardly think that I had better go into their description to-night. I spoke of two or three of the methods in the discussion of Dr. Case's paper read before this society. Any one who desires can see the patients who are wearing these appliances.

The doctor's paper has interested me from a physiological standpoint. He neglected to describe, as I think should have been done, that the immediate alveolar socket that covers the peridental membrane of the tooth should never be interfered with surgically, but the cancellous tissue between that and the outer or cortical layer should be removed, and when necessary include the latter. The cutting away of the alveolar process to permit the easy movement of the teeth is not a recent practice. It has been done for a number of years. Some of you will remember when I described the method of removing the lateral walls of the process after the extraction of the first bicuspids for the purpose of moving the six anterior teeth backward in the circle of the arch.*

For several years I have practiced removing the germs of the first bicuspids and the lateral walls of the process in cases where the anterior prominence is hereditary, and then moving the six anterior teeth and process backward. In this manner the teeth can usually be carried back at a better angle. The application of force that will hold the teeth in an upright position is quite essential. I have a little patient who is wearing an appliance in which the four incisors are cemented together by the use of a cap, and from that arms are attached which rest on the grinding-surface of the first permanent molars. The lower incisors closed very high against the palatal surface, and a little table or projection is soldered to the palatal side of the cap in such a manner that the lower incisors close against this table, which presses them into their sockets and allows the permanent molars to develop more thoroughly and hold the arches farther apart; at the same time the application of pressure to the upper incisors forces them back bodily, so that a very marked change has been brought about,—in fact, it is one of the most extreme cases that I have regulated in the past four or five years.

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*DENTAL COSMOS, 1890, p. 293.

At the meeting of the American Dental Association at Old Point Comfort, I recommended, for the purpose of preventing teeth used for anchorage from tipping forward, to swage a cap of metal to fit over the molars and bicuspids, cementing it permanently to place, and making the application of force from that. I have no method that will hold the teeth so firm with so simple an appliance. It is perhaps not included in the paper, but it covers the principle shown in the charts.

Dr. A. R. STARR. I will say a word in regard to the leverage question. I think I have Dr. Ottolengui's idea as to the movement of that apparatus. He says that if the collar and the bar which is attached to the collar are immovable and rigid, the whole tooth will have to move, root and all. That is very evident to me; still I think it is almost an impossibility to get an apparatus of that sort which will be absolutely inflexible. Now, if we grant that this [pointing on the chart to that portion of the superior maxilla just posterior to the coronal portion of the roots] acts to a certain extent as a fulcrum, then I believe it makes a big difference whether or not we have a short or a long extension from the collars. In order to discuss this question intelligently, we must first determine just what portion of the bone acts as the fulcrum or offers the greatest resistance.

Dr. OTTOLENGUI. It is very natural to suppose that it takes less power with the long arm, but the whole argument is that it is not an arm in the sense of a lever, but a fixed extension as though it were a continuous part of a tooth. We have a triangle; this side is no longer a lever; it is an extension to permit you to apply your tension at the point where Dr. Case or you think it will do the most good. The rod is not a lever; it is a part of the tooth, as he expresses it.

Dr. JOHN I. HART. I am impressed with the idea that the "force" is somewhat miscalled. I am inclined to think, if we regard that extension as a lever instead of an extension and a fastening to the tooth, we can the more readily realize that the extension is advantageous in the movement of the tooth.

Dr. OTTOLENGUI. That is just the point that the author denies,—that it is a lever.

Dr. HART. He recognizes the force, but he miscalls it.

Dr. GUILFORD. We must bear in mind that the tooth is the lever always, and not the rod that extends downward. The tooth is the mechanical power. The arm extending upward has nothing to do with it, except that it furnishes a convenient means of applying the power. Dr. Ottolengui thinks that it does not matter whether the arm is short or long, but he can readily see for himself. I will show with this model. If we apply power at this end, we lift the rod up, but if we apply it at this end we press it down; and yet this point is anterior to the fulcrum. The fulcrum is the point upon which the lever moves.

Dr. GEO. EVANS. Which part of that tooth is held so that it is not supposed to move at all?

Dr. GUILFORD. We do not mean absolutely immovable; we mean relatively so. It is supposed to move so little that we speak of it as not moving at all. There is no rod that cannot be bent, and yet we speak of it as a rigid bar.

Dr. EVANS. The fulcrum is the fixed point that does not move.

Dr. GUILFORD. If you consult any book on physics, you will find that it speaks of rigidity as a condition that is relative.

Dr. OTTOLENGUI. Is it not a fact that Dr. Case has gone to a great deal of trouble and has exercised a great deal of ingenuity in showing us how to move the end of a root, and would not that show that the end of the root does not ordinarily move?

Dr. GUILFORD. It alters the condition very much, whether it is held firmly here or not. Perhaps Dr. Evans was thinking of that.

Dr. EVANS. I was wishing you would define where that was held firmly. From what you have said, it is merely conjectural.

Dr. J. F. P. HODSON. Is it not where your regulating plate at the neck, or otherwise, impinges upon it? Is that not your fulcrum? You must attach that lever to something.

Dr. GUILFORD. Yes, to back teeth. This part is attached to some teeth in the back that serve as resistance in order to get tension. Dr. Ottolengui asked whether I did not think Dr. Case amplified this too much, so as to make a great deal out of a very little thing. I think so. Dr. Ottolengui asked why is it necessary to go to all that trouble to move the root? It is seldom necessary where the lower teeth are prominent, and where the upper teeth also protrude. Where there is a hollowness under the nose, it is important to move the roots of the anterior teeth forward, and any appliance that will enable us to change that condition and improve the expression is certainly very valuable. But that is the only place where I could conceive of it being of any value.

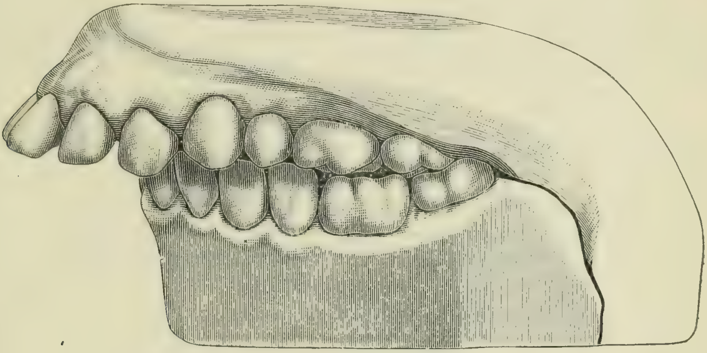
W. J. TURNER, M.D., D.D.S.,
*Editor New York Odontological Society.*

# FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

The First District Dental Society of the State of New York held a regular monthly meeting Tuesday evening, October 11, 1898, at the New York Academy of Medicine, No. 17 West Forty-third street; the president, Dr. Alfred R. Starr, in the chair.

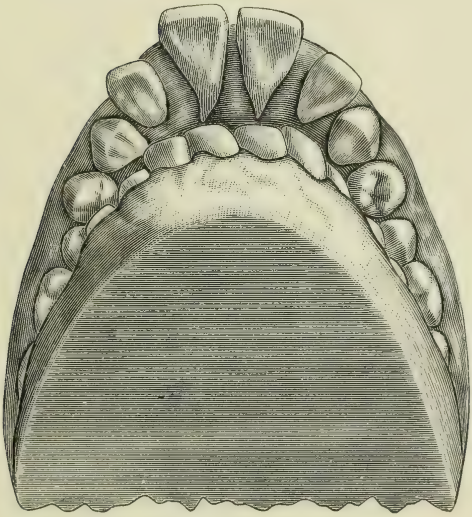
The secretary read a communication from Dr. J. M. Henriquez, secretary of the Dental Society of Buenos Aires, who was at one time an active member of this society. Accompanying this communication were two models illustrating a marked protrusion of the upper incisors. (Figs. 1 and 2.) Dr. Henriquez solicited the opinion of specialists in orthodontia, and fully described the case as follows:

FIG. 1.



Lateral occlusal view.

FIG. 2.



Palatal occlusal view.

Miss A. P—, seventeen years of age, began to erupt her permanent teeth at the age of five years. Her temporary teeth presented no signs indicating her present condition. She was neither a thumb-sucker nor a mouth-breather. At the age of thirteen she was attended by a dentist for ten months, but the dentist leaving the city after that time, she did not call on another until she was fifteen years old. This one attended on her for one year, but without any satisfactory results. This discouraged her, and she remained for another year without any further treatment. Last week she was recommended to call on me, but I find the protrusion so excessive that I prefer to hear the opinion of some of our specialists, as Drs. Angle, Farrar, Kingsley, Guilford, and others before treating the case. I fear there is very little to be done in the way of appliances, and to extract the incisors without removing a portion of the bone I see very little advantage. Please pay special attention to the bite, and above all the palatine surface of the central upper incisors.

JOHN T. CODMAN, D.M.D., of Boston, Mass., then read the paper of the evening, entitled "Items and Results from my Long Experience in Dentistry," an abstract of which follows:

The essayist felt it to be a duty as well as a privilege to record some of the results of his practical experience gained during fifty years of dental practice. He had begun the practice of dentistry at a time when of necessity the dental practitioner not only made his own tools and prosthetic appliances, but prepared his own alloys, compounded his porcelain materials, and manufactured the artificial teeth which he used in his practice. He was among the first to advocate the use of amalgam as a tooth-filling material, and, notwithstanding the prejudice against the placing of amalgams in cavities in contact with gold, had for many years used amalgam to repair cervical leaks in cavities filled with gold, with great advantage to his patient, though he had been in some instances denounced for it by his professional brethren.

At the time when the extraction of the first permanent molars was advocated he had taken positive grounds against the method on principle, inasmuch as he had found that "the supposed forward movement of the second molar, thus closing the space made by the extraction of the first molar, was partly a fallacy, and that the spaces were filled partly by the retrograde motion of the bicuspid. Also that another bad result of the practice was to bring the other teeth together in closer occlusion, so much so at times as to spread apart the upper centrals and laterals.

He had early recognized the valuable properties of oxyphosphate of zinc as a filling-material. His method of using it is as follows: Having the cavity prepared, the walls are lined with a sticky mixture of the cement, taking care that it fastens itself well to the tooth. A soft mixture of oxyphosphate and amalgam not too closely intermingled, and which will be sufficiently adhesive to stick well to the first filling, is then added; lastly the whole is covered with clean amalgam, which will adhere firmly to the second mixture and make a cover to it that will keep out all moisture and preserve the under fillings indefinitely. The materials can all be mixed at one time, the amalgam first, and the operation is not at all difficult to perform. He makes frequent use of oxyphosphate as a means in fastening the starting piece of gold to the surface of a shallow cavity where one might be tempted to drill a retaining pit, to the great discomfort of the patient.

He took exception to the frequently expressed belief that the older dentists, "the fathers of the profession," as they are called, filled teeth better and made them last longer than those of the present time. It was his belief that the best work of the modern dentist is ahead of that of the former dentists, in stability, in contour and beauty of finish, and the general average of work is superior to the former average.

The result of his experience in the use of all kinds of gold preparations was, that the distinction between cohesive and non-cohesive gold should be abolished, for the reason that all pure gold is cohesive, and if any preparation of foil is not cohesive, it is either not absolutely pure, or it is dirty. The purest and cleanest gold is the most cohesive, but at the same time it has the redeeming quality that it is the softest.

After going the rounds of experiment in gold-filling preparations, he had returned to No. 4 pure foil. It is markedly cohesive, but has all the working qualities of softness, and had given him the best results. He uses so-called cohesive foil in a non-cohesive way. For example, in filling against the cervical wall of a large cavity he uses a large "wad," pellet, or mat to start with, or better generally, two, wedging them together. These two pieces should be large enough to entirely cover the wall after they are condensed. They are driven to place and consolidated with a few full blows of Salmon's automatic mallet, made under his supervision and numbered 1060. Breakage of the margin under these blows is avoided because of the even pressure of a large surface of gold and a broad-faced plugger. He finds this method of condensing produces a harder and better result than that attained by hand pressure. Having made in this manner a solid-driven, flat surface on the first half of the filling, the remainder can be made by the use of smaller pieces, condensed by hand and mallet, and placed heated, or not heated, as occasion requires.

The method described was not claimed as the only method by which good fillings could be produced, but as the one of which many years of experience proved to be the best in his hands. He was opposed to the "hammer hardening" of all fillings, as it was his belief that one reason for marginal leaks is the chipping off of the edges of cavities done in trying to be sure of the tightness of the filling by using small pieces of gold and trying to weld them by repeated small hammer-blows of the mallet. He believed it to be safer practice to condense them sufficiently with the mallet, and then complete the condensation by hand pressure, in a direction at right angles with the first condensation; but if the gold is condensed too much by the mallet, it will not condense well in an opposite direction.

The essayist laid stress upon the necessity for proper instruments for excavating cavities, especially those upon approximal surfaces. He had not been able to find in any dental depot the long hoes and hatchets, well tempered and well shaped, which he deemed absolutely necessary for the skillful performance of the work. Many of his own were made as long as seven-sixteenths of an inch. He had seldom used gold as a root-filling except in front teeth, his preference being for gutta-percha as a root-filling. He advocated the puncturing of the pellet with a small needle before driving the pellet to place, in order to permit the escape of the otherwise confined air of the root-canal.

The essayist laid stress upon the importance of attending to the occlusion of artificial teeth in order to secure satisfactory results for the patient. He maintained that the deep articulation of the natural teeth cannot be reproduced in artificial sets except to the disadvantage of the latter, for the reason that while the natural teeth are deeply implanted in sockets and with great firmness, the artificial ones are only laid on the jaws and held in place by "the suction," that is in comparison to nature's implantation as a baby's strength to a giant's. Interlocking cusps must therefore be largely smoothed down and sufficient opportunity left for abundant lateral motion, otherwise the sets will be thrown off their resting-place on the jaws. It also happens quite often that the interlocking is too great in the natural teeth, and that they need relief from it, which is given by the toning down and lessening of angles of occlusion in one or both jaws.

He regarded malocclusion of the natural teeth as a prolific source of disturbance of the pericemental membrane, and the proper treatment the lessening of the shock of occlusion by judicious grinding of the occluding surfaces. The grinding should always be toward planes, never to points or angles.

He made a strong plea for conservatism in dental operations and for more thoroughness and care in searching for the sources of discomfort which afflict patients, and the intelligent application of remedial measures.

*Discussion.*

Dr. Wm. Carr. The essayist has touched upon many subjects that have interested and perplexed us. I would like to ask, When does he consider it necessary to extract the first permanent molar, and at what age does he get the best results?

Dr. Codman. That the gentleman has asked a pretty hard question, his own experience must have taught him. Dr. Riggs and some others whom I have heard speak on the subject said, "If you take out the lower first molars, be sure you take out the upper ones also." I thought that was a great mistake, for you contract the jaw proportionately as you take out those teeth. If the upper arch be small and the under arch large, if you are obliged to take out the lower molars you may bring the two arches nearer together; but if you take out the teeth when the upper arch is large, you continue the malformation. My idea has been to attempt, as well as I could, the preservation of the size of the jaw. The tongues of many people are so large that if the dental arches are contracted it will not be comfortable for them to speak, the tongue will seem to be in the way, and be too closely fenced in. Observe this point, which I consider very important: if you preserve the connecting membrane between the teeth and the jaw, you will never have an ulceration, because ulceration usually starts in that place. The great trouble with the earlier dentists was that when they found those teeth badly decayed, they did not think it worth while to fill them. They would not use anything but gold, and they found that condition generally in children, so it seemed the best thing to take the teeth out.

When my youngest child was about five years old, he had a very serious sickness, and when his first permanent molars came, they were very poor teeth. At eight years, I was obliged to destroy the pulp in one of those teeth. My son is now thirty years old, and although I never filled the roots, he still has that tooth in his mouth, and it is still useful to him. That is one of the results of knowing how to preserve the articulation. Sometimes within those years the tooth has "risen up," as it were, and felt a little lame. Whenever he has spoken of that, I have ground off a little of the tooth, and the inflammation passed away. I have done that also with a great many other teeth. For instance, one lady had a tooth that "came down," as she said,—began to elongate. I ground it off every time she came in for that purpose, and I kept that tooth in service fourteen years.

Dr. Carr. Did you fill the roots of this lady's tooth?

Dr. Codman. No, the tooth was not open at all. The pericementum was alive.

Dr. Charles G. Pease. The question asked by Dr. Carr carries me back in memory to my experience before the Examining Board of New Jersey. Under "Practice," I was asked that question, and I tried to answer it. If the first permanent molar, at an age prior to the eruption of the second molar, is found in a condition that would indicate usefulness of even ten years, I would extract that first molar then. If after the eruption of the second molar, or its presence at the surface, the first molar gives evidence of usefulness for, say, ten years, I would retain it. It has been my experience that the loss of the first molar, after the eruption of the second molar, not only causes the loss of the masticating surface of the first molar, but also the loss of the usefulness of the second molar in masticating, because in the large majority of cases the second molar does not move forward in a perpendicular position, but tips forward, so that only the posterior margin of the tooth occludes with the upper teeth, and the surface of the tooth is useless in masticating, as there is no occlusion except with the posterior margin, the tooth having tipped over, the apices of the roots remaining almost in the original position. Of course there are exceptions to this. Then there are questions of regulating affecting the retention or non-retention of the broken-down first molar after the eruption of the second molar.

Dr. Codman. I do not think I answered Dr. Carr's question properly. I should say that as a rule I should keep a first molar until the second molar was in place, and then it would not tip over. If it be extracted too soon, the tendency of the second molar is to tip over into the place occupied by the first.

Dr. CARR. The question has been brought up as to the use of oxyphosphate and amalgam. Does the essayist not complete his filling with amalgam only? What is the proportion of these materials, and how long would such fillings last, and also what is the character of the teeth in which the combination should be used?

Dr. CODMAN. I was asked that question to-day by one of our older men. There seems to be an idea that the presence of oxyphosphate near the pulp will destroy it. I have not found it so in my practice. When we say oxyphosphate, we cover all the oxyphosphates that are made, and all the sins of the makers. I think a pure oxyphosphate is made with the oxid of zinc and the phosphoric acid, but some of the preparations which we call oxyphosphate are not made in that way, but contain other acids. Personally, I use the Harvard cement, and mix it without a surplus of oxyphosphate. When the cement is thoroughly hardened, there should be no surplus of any acid which can act in any way upon the pulp. I place that at the deepest point of my cavity, and never let it come to the outer margins. This mode of filling which I spoke of was more particularly for very badly decayed teeth. Having my amalgam all ready in a soft state, I mix a portion of the oxyphosphate and the amalgam together, and add that on. That attaches itself to the other, if the other has not grown hard, and that leaves enough of adhesive matter—of the connecting amalgam—to unite it with any amalgam that you place on the top. I have found those teeth lasting wonderfully well.

Dr. DEANE. Do you add the oxyphosphate to the dry alloy, or to the amalgam?

Dr. CODMAN. I combine it with amalgam.

Dr. PEASE. The extraction of the first permanent molar any time after eruption of the second molar would admit of the second molar tipping into that place. If the first molar were to be extracted at all, it should be at some time prior to the eruption of the second molar, in order that the second molar might come up as near to the position occupied by the first molar as possible.

Dr. CODMAN. This confession which we make, if we say we extract the first permanent molars, is a confession that we cannot preserve them. I think we ought to preserve them, and with all the means which we have now at hand, I do not see why we cannot do it. It can be done almost universally, and there does not remain that cause for extracting there was formerly, viz, that we could not preserve them. We will find that those teeth have a great deal of recuperative energy. If you keep the tooth along, not expecting always to keep it for a lifetime, but for two or three years, at the end of that time you will often find it has hardened. First you may put in an oxyphosphate filling, and later you find you can put in an amalgam filling, and at the end of perhaps ten years you will find the tooth is still doing good service.

Dr. CARR. Do the bicuspids ever have to go?

Dr. Codman. They should not.

Dr. Carr. Can you save ninety per cent. of all the teeth up to forty years?

Dr. Codman. I think so.

The President. Do you get better union between the amalgam and oxyphosphate by mixing it outside of the mouth, than by mixing the amalgam with the soft cement in the tooth?

Dr. Codman. I do not know that there is any special difference. I think mine is the better way. I do not mix my amalgams too dry; I mix the oxyphosphate, and perhaps at the same time I will take a portion of the oxyphosphate and mix the amalgam with it. I place the oxyphosphate at the bottom, then I put another dose on top of it, keeping clear of the margins, and with the amalgam I finish the rest. I have sometimes filled a cavity that did not seem to have any retaining form, and have made the adhesive property of the oxyphosphate hold the filling in its place.

Dr. Pease. When I practice that method, I do not use too dry a mixture of amalgam, but I finish up with the wafers advised by Dr. Flagg. I use the wafers that have been thoroughly dried, having the excess of mercury expressed from them, and that gives me a hard surface.

Dr. F. L. Fosheim. Four years ago my attention was called to this method of filling without undercuts in the teeth, and I have tried it with success. I make the oxyphosphate very sticky, using Britton's cement to line the cavity, and into this work a soft mixture of amalgam, finishing with that of a dryer consistence. As far as I know, no fillings have fallen out in my four years' experience with this method. It is not absolutely necessary to have undercuts in the tooth, if the amalgam is properly put into the soft cement.

Dr. Nelson T. Shields. If you have a large cavity with frail walls, and it is necessary to line the whole interior with cement, you could not use a better material than the Harvard cement, which the essayist has mentioned. Even with the pulp exposed, it can be capped beautifully with that cement. By the gentle manipulation of soft non-cohesive gold used in strips or ribbons you can save the tooth without depending upon amalgam at all. The instruments we use we have made to order. By this manipulation of non-cohesive gold, we save teeth of the poorest possible material. We know it is the most wholesome material, properly manipulated, for this purpose, and nothing under heaven will save teeth better.

Dr. Wilber M. Dailey. I would like to ask the essayist if he has used Abbey's soft foil in any way. I understood him to say that there is no such thing as soft foil.

The President. He said all pure gold was cohesive, and any non-cohesive gold was either impure or had something on the surface to prevent cohesion.

Dr. Dailey. After thirty or forty years' use, gold would show any impurity that was in it. I have seen fillings of Abbey's foil that were made that long ago, and I have always heard it was pure gold. It is the first time I ever heard it was impure. If I am using an impure gold, I would like to have the doctor set me right.

Dr. Codman. I would like to ask the gentleman if he knows the difference between gold that will stick together and that which will not.

Dr. Dailey. The soft gold of Abbey's is laid between small pieces of paper a little larger than the pieces of gold, and then carbonized. It is claimed that by that method they destroy the cohesive property of it.

Dr. Codman. I simply stated in my essay that the gold was either impure, or else it was smutched with something. If it is carbonized, it is smutched with something. I do not know what has been used. In some cases I think it is put in whiskey, or something which leaves a little gloss on the surface. That does not prove that the gold itself is impure. I did not make that statement. I said it is either impure, or there is something on the surface that will prevent it from sticking together. I have some fillings in the mouth that have been in over thirty years, that were probably made of Abbey's foil. It does not prove that because that foil is a little doctored you could not make a good filling, under some circumstances; but you cannot get that cohesion which you find where the gold is perfectly clean and perfectly soft.

Dr. Dailey. Don't you think its being soft is an advantage?

Dr. Codman. It depends on what you call soft. You might call it soft if two sheets passed each other without sticking. I call soft the finest of gold. It will stick, but it is not hard, and does not ball up.

Dr. Shields. That is just what you desire in a soft gold foil,—soft gold introduced in ribbon form, every ribbon standing upon end, and compressed gently with a hand instrument. The gold spreads against the walls just as hard as you mallet, and if you mallet softly, you can use the gold without any base metals in the mouth at all.

Dr. Fosheim. The gold I have found the best to use in connection with cement is Watts's Crystal Gold. When you tear it in pieces and pull it apart, it is very ragged, and when you push it into the soft cement it seems to enter very deeply into it. It does not ball up. Some claim it discolors, but I generally make a surface of cohesive foil. The crystal gold can be used in large pieces, and condensed very quickly.

Dr. Shields. Dr. Codman said nothing about crowns. In cases of very badly decayed roots, he said people expect you to restore them to their normal usefulness. If the roots are well filled you can mallet upon them freely. Danger of periostitis only comes from a root that is not well filled. When you have the apex and the canal well filled, you can put on a crown that will restore that tooth to its normal usefulness. Latterly, in the last two years, I have been using the saddle-back crown for bicuspids. I have not had an opportunity to bring it before the profession yet. There are many saddle-backs made, but the proper way of adjusting saddle-backs, so they will not show gold at all, will make a beautiful piece of work, and will restore the tooth to its normal appearance and usefulness.

Dr. CODMAN. I did not mention crowns particularly, although I think I spoke of them incidentally. I have brought you these results with this intention,—that you should not all go over the same ground that I have been over. A great deal of it you need not travel. I tried to bring you results which have come to me, and which I think will come to you if you go over the same ground. I do not pretend to say that I have traveled so far as some of the gentlemen who are here; neither have I told all my experience. I am very glad that some of those who are here have taken up the subject where I left off. I do not see anything unreasonable at all in displacing some of my amalgam and putting gold in the place of it; that might be an improvement. The class of teeth that I had particularly in mind were those generally given up by dentists as being of no value. You cannot fill them, because the cavities are so large, and the teeth so poor, and I have built them up with that plastic material and made them of use for many years. I have brought the subject to this point, and the younger men might take it up where I leave off, instead of going over and over the same thing. If I have given them any hints by which they may reach better results without working so hard as I have, that is what I am here for. I do dislike very much to see crowns where they ought not to be. I think the preservation of the natural tooth is a higher art of industry than placing crowns on teeth. Many teeth I think are neglected. The fad will pass by, and in a little while the intelligent members of the community will turn their backs on gold crowns and demand something that looks natural.

Dr. SHIELDS. I referred to porcelain crowns.

Dr. CODMAN. I approve more of porcelain crowns. I know that it is possible to save a great many teeth without covering them with gold. I may speak of a little mode of putting on gold corners, which I do not see much adopted,—instead of covering the whole tooth with gold, adding a little gold corner. It is a very pretty piece of work, and most persons can hardly distinguish it from a gold filling.

I thank you for your courtesy in listening to my paper.

Dr. CARR moved a vote of thanks to the essayist, which was unanimously carried.

Adjourned. B. C. NASH, *Secretary.*

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## NATIONAL DENTAL ASSOCIATION—SOUTHERN BRANCH.

(Continued from page 932.)

### FIRST DAY—*Evening Session* (Continued).

THE committee appointed to consider the president's address made its report through Dr. L. M. COWARDIN, chairman.

After commending the address as a whole, the committee recommended in accordance with the action taken at Old Point Comfort that the name of this association shall be the Southern Branch of the National Dental Association, as provided in Article 14 of the Constitution. The committee, commenting upon the point raised by the president that two-fifths of the dues received by the association might prove insufficient for its maintenance, directed attention to the fact that the Southern Branch after having paid over three-fifths of the dues received to the treasurer of the National Association will secure the following benefits,—viz, the publication of its proceedings by the National Association, and that a copy of the Transactions, together with the Transactions of all the other branches, will be furnished to each member; that the National Association will also undertake to pay for any scientific investigations recommended by the Southern Branch, and that each member of the Southern Branch will receive copies of any publication that may emanate from the National. It was therefore recommended that the plan set forth in the Constitution be tried for at least one year.

The committee commended the zeal displayed by the president to build up the membership of the branch, and recommended his example to succeeding officers. The committee expressed the desire that the portion of the president's address referring to examining boards be again read and discussed, inasmuch as the committee being composed of college men felt a delicacy in recommending action upon that point. They further suggested that a resolution be adopted instructing the corresponding secretary to communicate with prominent life insurance agents setting forth the importance of the examination of candidates for life insurance by oral pathologists. It was recommended in conclusion that the address be published as a part of the regular proceedings of the association.

The report being on motion received, Dr. Beadles offered a resolution as follows:

*Resolved*, That we, the members of the Southern Branch of the National Association, hereby request the National Association to allow the branches to retain three-fifths of all dues.

A vote being taken,action was nearly unanimous in the negative.

That portion of the president's address relative to examining boards having been again read as per resolution, Dr. C. A. BLAND, Charlotte, N. C., said,—

It must be admitted that the colleges did not put forth their best energies until they were pushed forward by the examining boards. I do not believe that the antagonism spoken of really exists. I should like to hear the subject discussed.

Dr. E. P. BEADLES. Not being "a college man," I am free to say what I please. In the first place I am in favor of the colleges. Some one said the antagonism spoken of does not exist. I am very glad to know it, but somehow or other we are being made to believe that it does exist. Who is responsible for that belief? If it does not exist, the guilty parties ought to be sat down on. Who is it? Is it the editors? If so, let them speak out; let us see who it is. If there is nothing in it, let us shut down upon it. Editors must have something to print, but if that is all there is in it, I am glad to know it. I was sorry to believe that such hard feelings existed, and shall be glad if there are no grounds for the belief. However, something must be done to keep incompetent men out of the profession, and that was how the idea originated that some restrictions upon the schools were necessary.

Dr. J. N. JONES. I was in hopes that some other member of State Examining Boards would have something to say upon this very important subject. The colleges which are doing honest work have nothing to fear from the examining boards. What are the boards for? They can have but one object,—raising the standard of dentistry. I have been interested in reading the proceedings of the National Board of Examiners. Certainly no college need fear their requirements. Our State Board is not a member of the National Board; we have been content to go along slowly in our own way, but I have felt that the National Board was accomplishing a grand work. If it succeeds in placing a check upon the reckless manner in which some colleges have turned out so-called "dentists," it will have accomplished much. It is true some colleges have refused to comply with the demands of the National Board,—colleges, too, that certainly had no reason to fear the requirements; but I, for one, propose to heartily indorse the action of the National Board. We should not be too hasty in jumping at conclusions. Are they not working in the cause of progress? Are they not all men who have the cause of dental advancement truly at heart? Do they not make daily sacrifices for the upbuilding of our grand profession? College men are like all other men, in that they are not perfect; some may even be self-willed, some may even have a thought for the silver dollar,—they are but human. But all should be willing to comply with the recommendations of the National Board. I hope the day is at hand when there will be no way to enter the dental profession save through the dental college. The dental law of Florida is due to the efforts of our State Society. Florida was formerly the great dumping ground, but that is changed now. I hope the time is coming when a college diploma will be made the universal prerequisite to license.

Dr. S. B. COOK. We meet with one great source of trouble in Tennessee, and I gather from Dr. Jones's remarks that it is the same in Florida, and that is the application of second-course students for license to practice between terms. I understand that Florida makes a diploma a prerequisite to examination. I would ask by what authority you can do that?

Dr. JONES. By a provision of the dental law.

Dr. COOK. We had to examine thirteen or fourteen student-applicants.

Dr. JEWETT. I made the remark, alluded to by the president, that there is no conflict between the colleges and the boards. Some one is responsible for statements to that effect. There is no conflict between the National Board of Dental Examiners and the

National Association of Dental Faculties. The former was inclined to exceed its authority, but that has all been happily settled. The state boards have a duty to perform. They act as a check on the colleges to the extent that if an incompetent graduate comes before them they turn him down; this must be a check upon any disposition to turn out students recklessly. But what college would knowingly so risk all that has been spent in building it up? It would be certain death to that college; competition is too sharp, too close, to take such chances. They know their students must attain a high grade to have a standing before the state board. You ask what is the use of state boards? Why, the state boards have done more to enforce the laws, to build up the colleges, than any other one thing. Colleges that teach only how to put in an amalgam or a cement filling and make a rubber plate have no show before the state boards, and students soon find out where the men come from who pass the boards. The boards are the greatest possible aid to the colleges in carrying out their highest ambitions.

Dr. Beadles. Then who is responsible for all we hear and read on this question?

Dr. Cowardin. The trouble lies in this: We, as college men, are on one side of the fence; the boards are on the other side. Let each do his own share of the work and there will be no antagonism. I was surprised to hear our president say that this body ought to uphold the National Board of Examiners in blacklisting the colleges.

Dr. Beadles. I said that the state boards should uphold the colleges that meet their approval, and blacklist those that prove themselves inferior. I did not ask the association to uphold the National Board.

Dr. Cowardin. I take our president's statements in his address as his recommendation of what in his opinion ought to be done by this body. The National Board, through its representatives from the state boards, undertakes to say to the colleges in a dictatorial manner—Do thus and so or we will blacklist you and publish you to the world as disreputable, and that is the trouble. I have the greatest respect in the world for the state boards, but let them attend to their own business, not to ours. Their mission is as high as that of the colleges, but I look upon the colleges as private institutions of learning. The office of the boards is to protect the public; they are not the guardians of the college. If we do not send to the boards men who can stand their examination, their function is to bar them from practice. The colleges do not undertake to say to the boards, "You must do thus and so." I say let the college attend to its own business, and let the boards attend to theirs, then there will be no trouble. In my state the amendment to the law that the Florida Society has obtained—the diploma as prerequisite to examination—has just been repealed by our legislature. When a law is made too strict for the public, then a man goes to the legislature and asks for a relief bill. The session before this thirteen dentists got the ear of a man who controls a hundred votes, and they got a relief bill through, through their pathetic appeals. There was danger of having the whole law repealed, regulating the practice not only of dentistry, but of medicine, pharmacy, and veterinary surgery. The efficiency of the whole law was endangered.

Dr. B. Holly Smith. There can be no progress without friction. Such discussions as the present are not fruitless nor profitless. But we want to be consistent, and not unfriendly. The examining boards are created by law. They were not created to oppress the dentist, but to protect the people. But I place myself in the position of the student,—they are our human brothers; I cannot make my heart like stone and say, "You must absolutely reach this mark." If a young man is frightened, his timidity may cause him to fail,—you might fail in the same position. It is not in my heart; I have not the judicial mind; my temper is to put up with human frailty. Our duty is to help our fellow-men; not to keep them out, but to prepare them to enter in. For this I labor in my school morning, noon, and night; my one purpose is to send out young men having the stamp of energy, imbued with knowledge. It is the most painful thing in my life to feel, "I cannot vote for this man"; it is a struggle for me; the hardest task to decide, "You shall not graduate"—to reflect, unless he gets my vote he must fail. I would be glad if I never had to pass sentence. I love to teach, but it is a heavy burden to examine. I would not openly proclaim the flame and sword, but the usefulness of the examining boards has been greatly overrated. If they came to my door to examine my student, I would labor earnestly to enable him to pass. I would even study *theology* if the board said they had to have it. But we don't know what the requirements of all the state boards are, and it is impracticable to meet *all* requirements. The men who graduate from our colleges are fit to practice dentistry, though they may fail to pass the examining board. A young man, from sheer timidity, may fail to pass an examination, yet if you handle him cautiously, give him an opportunity to tell you in his own way what he knows, you may find him absolutely competent, yet through constitutional timidity he may utterly fail to pass the board. One such young man said he was treated as if he was an intruder, an impostor trying to get in where he had no business.

I have antagonized examining boards openly, but I have withdrawn my opposition and strive now for one thing,—the unification of dental laws. I am a murderer according to the verdict of a physician who attended the death-bed of a certain young man; he said he was murdered by his examinations,—the terrible strain of passing the college examination followed by that of the state board utterly prostrated him. The people are behind the lawmakers. You cannot make a law acceptable that is enforced obnoxiously. Those thirteen men who went before the Virginia legislature with bleeding hands and wounded hearts demanding that the examining board be wiped out, that they might put out their shingles even though not qualified, believed they were voicing public sentiment, and they forced the repeal of an obnoxious feature of the law. I am now working for the unification of state dental laws. Examine my student if you want to, but when he has passed once, let him go; don't torture him to death forever and eternally.

Dr. H. H. JOHNSON. The question has been raised, Is there any conflict between the boards and the colleges? I do not mean to say that all the men composing the college faculties individually antagonize the examining boards or the National Association of Dental Examiners, but there are many men whose words have weight, who are utterly antagonistic. There are mutterings, there are whispers, there are outspoken words, there are bitter feelings. It has been said on this floor that there is now no conflict; that everything is serene; that the National Board of Examiners had overstepped its bounds, but had retracted. But that is a mistake. The National Board of Examiners, at Saratoga last year, adopted the standard that the colleges had adopted. They asked the colleges if they still intended to carry out that agreement, asking them to sign certain blanks stating that they would carry out what they themselves had adopted. It seemed to be necessary to urge them to do what they had promised to do.

Dr. COWARDIN. Will you allow me to ask one question; was it not a reflection upon the college faculties, when they had adopted a standard, to ask them *if* they intended to carry out what they had promised? That in itself was enough to bring about a conflict.

Dr. JOHNSON. They simply wanted the signature of each college to the agreement.

Dr. COWARDIN. By what law did they claim the right to ask such a thing? It was enough to rouse antagonism of the bitterest kind.

Dr. JOHNSON. It did not amount to that much at all. If a college signed an agreement to adopt a certain standard, and then failed to carry it out, refusing to do what it had promised, then that college should be dropped from the reputable list. It has been claimed that the National Board of Examiners had no power, no influence, no standing, no nothing. In that case what effect could it have had for the board to drop the college from the list? The claim has been made by leading journals that there is no use for examining boards; that there never has been any use for them. I claim that there has been, and still is a need for examining boards. If we do away with examining boards, we take away all stimulus from the colleges. I have been glad to hear that admitted here. At the meeting at Old Point Comfort last summer the Association of Faculties went back on everything they had done before; the whole meeting was one of retrogression. They wiped out the standard; they said it was done in order to reconcile differences. Then a committee was appointed to fix a standard to which the examiners must agree. We will do so and so, and you must agree to it. There was no conference in that. If the Examiners were simply to accept what the Faculties adopted, there was no use in having any meeting at all. They proposed a lowered standard, because some colleges said they could not live up to the higher,—a standard to be gradually raised until graduation from a high school should be required in 1901,—and yet some of the most prominent colleges absolutely refused to subscribe even to that standard; they would not lower their dignity to subscribe to anything in agreement with the National Board of Examiners. And yet these very colleges already have a higher standard than that, but simply from what I call spleen they would not sign anything.

Dr. COWARDIN. I rise to a question of personal privilege; I desire to explain my position, and mean no offense. I simply wish it understood that my college be not included in that list.

Dr. JOHNSON. What I have stated is a statement of facts established beyond a doubt; not with any desire to rouse antagonism. I believe this thing will yet blow over, and that good feelings will be established between the colleges and the boards.

Dr. JEWETT. I also rise to a question of privilege. The statement was made that there was at one time apparently a conflict between the two national bodies. I would ask Dr. Johnson if it is not a fact that the Board of Examiners adopted a preliminary standard which had been adopted by the Board of Faculties at Saratoga, but that at Old Point Comfort the College Faculties were not ready to come up to the Saratoga standard and lowered it? The records will show.

Dr. COWARDIN. Did the opposition to the standard come from the Northern or from the Southern colleges?

Dr. JOHNSON. It came from the colleges beyond Mason and Dixon's line.

Dr. QUATTLEBAUM. I have had no experience either as a member of an examining board or of a college faculty. I have had experience though in standing examinations. I think it would elevate the standard of the profession if each one of us had to undergo an examination every five years. It would do no harm to any of us to feel that that was in store for us. If perfectly prepared we would not fear any board. The National Association of Dental Faculties blacklist or drop a college from the list; why should not the Board of Examiners do the same? I am in favor of standing by the state boards. Let us all pull together and try to get a high standard.

Dr. W. E. WALKER. Prior to my connection with a dental college I had three years' experience in the examining board of Mississippi. We had a fairly high standard, and passed about fifty per cent. of those we examined. We rejected but one graduate, and he was suffering from bad eyes and could neither read nor study. The standard is not sufficiently high, but if the colleges graduate only competent men there should be no conflict between the colleges and the examining boards. But in some states the governor has it in his power to put on the board men who are not competent or of proper character. We had one man on the Mississippi Board who became a rank advertiser. We could only get him off on condition that the entire board resign as a body, under pledge not to accept a position on the board again under that governor. But when the new board was appointed one man was put on who was not a graduate, and who had failed to pass the preceding board. And yet he is now examining others. It is bad when men are placed on the board through political influence. Our state law, however, was prepared by a constitutional convention. An amendment, restricting somewhat the appointing power, passed the legislature almost unanimously, but failed to become a law, the governor withholding his signature to the bill until too late for further action, on the grounds that it was "class legislation."

Dr. A. A. PEARSON. If those who fail are not better than some of those who pass the boards, I pity the balance. I know of one man who possesses a diploma from a reputable college who wrote at the bottom of his examination paper, "i think you ought to let me Pass because i done the best i could." I think it is all right to let a second-year student pass if he can stand a better examination than a graduate. If they turn out such graduates as some I know of, no one knows what they would do if there were no restricting boards. I don't care how many incompetent men they let in; it is all the better for me if they locate anywhere near me. But I hope the Alabama Board will stay just what it is, and I will help to hold it up.

Dr. H. H. JOHNSON. The experience of men on the examining boards is that the colleges are doing much better work now than a few years ago. Their graduates are better equipped. I am satisfied that the colleges are making every effort in their power to raise the standard of dental education. It is also true that the existence of state examining boards has been a stimulant to the colleges; I am also satisfied that in the near future there will be no conflict between the national boards.

Dr. B. HOLLY SMITH. There are some points in this discussion that are of great interest to me. Differences have arisen between the National Association of Faculties and the Board of Examiners that have apparently not been adjusted to the satisfaction of all minds. Many do not comprehend why these differences should exist. Dr. Johnson made some statements that are not substantiated by facts. If you could go behind the scenes you would see that his explanation is not quite correct. The National Board of Examiners declined to act with the National Board of Faculties in accepting a plan of preliminary examinations outlined by Mr. Dewey, secretary of the Board of Regents of the University of New York. The faculties in many of the Southern States are not such as to permit of such a high standard of preliminary examination. If the "count system" of the University of New York were adopted as obligatory by the National Association of Faculties, many of the schools in the South would be ostracised. This was made very emphatic at the conference of committees. As secretary I assumed the responsibility of staying the force of that rule, and that action was supported at the last meeting. As Dr. Johnson has said, the work of the colleges has greatly improved. Ten years ago we did not have the necessary text-books. The withdrawal of the "count system" was because it was not understood by many members of the board. The present preliminary requirements are fully the equivalent of the count system, but upon a different basis. It is not a retrograde step, but simply a modification. We must adapt our methods to possibilities; we must be temperate; work evenly and gently up to a more elevated plane. As a matter of personal feeling, I know many of the members of the Board of Faculties, and I know them only to love them. It is true there are men who always want to carry a point, who have stored-up energy behind them. If others don't see as they do they think they must be disciplined into it. But I contend that these things can all be settled by these two bodies themselves, and we should not say anything here tending to widen the breach. The Board of Faculties and the Board of Examiners are twin brothers; these differences will all melt away in feelings of brotherly love.

Dr. J. N. Jones. I received a personal letter from one of the members of the committee, explaining what their course had been, that we, as a board not affiliated with their organization, might clearly understand the position. They stated that they were bound to act in conformity with the rule they had established. But I do think that colleges which have won a reputation should not oppose a rule designed to check up the colleges which are not prepared or fitted out to properly equip students; colleges which have obtained a charter through political "pull," but which are not in position to teach dentistry. But for the boards of examiners they would turn out hordes of men that the profession would not be proud of. If they will not conform to the requirements of the boards they must suffer the consequence of having their graduates rejected, and of not being recognized as reputable.

Dr. Cowardin. Do you consider it the prerogative of the examining boards to pass upon the qualifications of a college faculty?

Dr. Jones. They can say if the college has not the necessary number of men on their faculty. They can pronounce upon their qualifications by the students they turn out. With sufficient "pull" any one can charter a college, and it could turn out Tom, Dick, and Harry indiscriminately if there was no board to enforce restrictions.

(To be continued.)

## AMERICAN MEDICAL ASSOCIATION—SECTION ON STOMATOLOGY.

(Continued from page 959.)

### Third Day—*Morning Session.*

This session was under charge of the Colorado State Dental Association, and Dr. W. K. Sinton, of Denver, occupied the chair. The meeting was called to order at 9.30, and after the usual routine of business Dr. G. V. I. Brown, of Milwaukee, read a paper, of which we give the following abstract:

## HYDROGEN DIOXID IN THE TREATMENT OF DISEASES OF THE MOUTH.

The author felt that there was a lack of appreciation by the dental profession at large of the desirable properties of hydrogen dioxid which rendered it of especial value in the treatment of diseases of the mouth. It is a germicide which is not a destroyer of tissue, nor does it impair its natural vitality, but does away not only with the living forms of bacteria, but with waste products and noxious gases as well, and by direct chemical action destroys and disorganizes the infective properties of pus. It possesses other properties which make it especially desirable for mouth use. It is a valuable detergent of the mucous membranes, cleansing them by removing adherent coatings which have a tendency to prevent the action of other drugs and antiseptics, by preventing their contact with the living tissues when used in the treatment of certain mouth-disorders. Particular stress was laid on the fact that hydrogen dioxid is not in itself an irritant to living tissue, but that where inflammatory reaction and irritations of tissue followed its application, the result was to be attributed to impurities in the preparation of hydrogen dioxid used, and which resulted from the method of its manufacture. Hydrogen dioxid is made from barium dioxid by the action of certain acids, notably sulfuric, hydrochloric, and phosphoric, and in some specimens the acids employed in their manufacture are not thoroughly eliminated, so that these acids or their combinations remain in the preparation, and give it whatever irritating properties it may possess.

The essayist recommended hydrogen dioxid especially as a cleanser of oral mucous membranes by way of their preparation for further treatment, and for the treatment of alveolar abscess, especially that form which has a fistulous opening upon the gum. In the treatment of diseases of the maxillary sinus, although some difficulty is experienced occasionally by reason of pressure when the opening in the nose is not sufficient, there was nothing which in his hands he had found could be so depended upon to force its way through and cleanse the parts as this agent. He uses a diluted solution for the purpose until the bubbles have forced themselves through into the nose, and then substitutes any other remedy that may be desirable. He had also found it of great value in the treatment of mouths from which sequestra of necrosed bone had been removed, as it could be depended upon to force its way through the opening left in the tissues in a more thorough manner than any other germicide. It had been especially useful in his practice in the treatment of putrescent pulps, and as an application after extraction of third molars to prevent the collection of secretions in the alveolar sockets, and as an application for use after extraction in general. For the bleaching of teeth, where a stronger solution is required, it is simply necessary to evaporate the dilute solution in a vessel over a water-bath until it has by loss of water been concentrated to the desired degree.

As bearing upon the clinical value of hydrogen dioxid, the author presented the results of some tests made at his request by

Dr. V. A. Gudex, of the Dental Department, Milwaukee Medical College, with a view to determining the character of the germicidal value of the agent in relation to the most commonly used antiseptics. The cultures were made in gelatin and potato, and were treated in the following manner:

Freshly extracted teeth were sealed at the apical foramen and cavities in the crowns filled with gutta-percha, thus excluding outside influences. Into the putrescent pulp-chambers of these were injected with a sterilized hypodermic syringe the drugs tested, the result of which is here given:

Oil of cinnamon, oil of cloves. Pulps remained septic for three days, although there was a marked inhibition of growth, which was increased by lowering the temperature of the room.

Hydrogen dioxid (Oakland). Very powerful immediate action; almost complete inhibition of growth. After one day lost much of this effect.

Formalin. Action slow. At the end of one hour growths were obtained; at the end of two hours growths were obtained; at the end of four hours almost complete sterilization; at the end of two days complete disinfection.

Bichlorid of mercury (1-1000). Immediate effect much more powerful than formalin; no growth could be obtained until after several hours, when it seemed to be much less effective.

### *Discussion.*

Dr. E. W. VARLEY, Pueblo, Col., asked Dr. Brown if in the experiments and cases enumerated the ordinary three per cent. solution only was used. In the paper it was suggested that evaporation would give greater strength, and he hoped Dr. Brown would describe the process of evaporation.

Dr. BROWN said the evaporation was by means of a water-bath, and if desired for purpose of bleaching teeth, for instance, the strength could be increased to twenty-five per cent., or any strength desired. The water-bath should be at the boiling-point.

Dr. W. K. SINTON, Denver, had used hydrogen dioxid extensively, and in most of the ways Dr. Brown had described. He asked Dr. Brown whether in case of a tooth with putrescent pulp-canal he would put the hydrogen dioxid into the pulp-chamber and seal it up. As for himself he had never used it in this way. He had used it for washing out root-canals, and had then used remedies which are more persistent, as the essential oils.

Dr. J. N. CHIPLEY, Pueblo, Col., asked Dr. Brown what was meant by the statement that with the use of hydrogen dioxid the sterilization was gone after two days. If this was true and it was used to sterilize root-canals, would they not be liable to give trouble afterward?

Dr. GEO. J. HARTUNG, Denver, spoke of hydrogen dioxid from the bacteriological standpoint. He had concluded that it was not a germicide but a cleanser, and in practice it amounts to practically the same thing. If you keep a wound clean you keep it aseptic, but a preparation which only inhibits the growth of germs for a day or two would be of little value. He thought formalin the most valuable germicide because of the permanence of its action, and believed it to be destined to be of great value in dental practice.

Dr. A. E. BALDWIN, Chicago, said he liked to criticise such a man as Dr. Brown when he could, and would now disagree with him in regard to the use of peroxid inside of the structure of the teeth. He had heard of cases where it had caused much trouble, because some portion got through the aperture of the root and caused pain. He agreed with Dr. Brown that the Oakland Company's preparation was far superior to any other. It is called the O. C. Peroxid, is exceedingly stable and almost neutral, and superior to any other he had used. But he thought it wiser to be conservative about new remedies or new methods of treatment. A backward glance through the literature of our profession will show a great many absolutely perfect remedies and methods of treatment which have after a short time been discarded. He was favorably impressed with formalin, but preferred to wait for a better acquaintance with it before using it or recommending it too freely. There are remedies that have been fully proved, and we should not too enthusiastically favor a new one at the expense of the old. Nor can you be sure, after even six months of successful use of a drug, that it will always prove efficient. He did not desire to discourage experimentation, but wanted to impress the truth that experimentation must be thorough and careful.

Dr. S. DAVIS, Denver, believed he drew the attention of this society to hydrogen dioxid the first year it organized, which was twelve years ago. He had been using it some time before that. He used it with a great deal of caution in the beginning, but now uses it very much as he would use water. He rinses out his throat, injects it into his nose when he wishes to,—not in full strength by any means,—but in his throat he uses it in full strength. He is not a particle afraid of it; he thinks it is one of the best things we have ever had. Twelve years' use of it straight along ought to show whether it is dangerous or safe. A short time ago a physician brought a case of diseased antrum into his office to have it opened up. He opened it up, and he took a fifty per cent. solution of peroxid of hydrogen and injected it immediately into the antrum. He thinks the solution was entirely too strong. The patient did not want it repeated. Be careful when you go into the antrum what strength you use. But he has used it in his own nose over and over again,—a very weak solution, judging the strength by the feeling.

Dr. BALDWIN advised extreme care when using it about the nose, for if it enters the antrum the effect will be very disagreeable.

Dr. A. H. FYNN, Denver, thought that in disease of the antrum there was danger of over-treatment. When the antrum is opened up, cleaned out, and drainage established, it is good policy to leave it alone and let it heal up. On the contrary, often, when healthy granulations are forming, drugs are forced in, the granulations are broken down, and nature has all her work to do over again. This is true of necrosed bone in the mouth as well as disease of the antrum. Often we have a case where the tissues of the antrum are broken down and the antrum is full of pus; we open it up, clean it out, and though we continue treatment for a month or more, fail to make a cure. The reason is, as Dr. Cryer has shown, the abscess may be in the frontal sinus or in the ethmoidal cells, and treatment of the antrum will not effect a cure.

Dr. A. H. PECK, Chicago, said there was no doubt but what Dr. Brown said of the Oakland Company's hydrogen dioxid was correct. Other preparations akin to it he had experimented with a great deal, and he could verify their inferiority. It would seem that oxygen should be an excellent agent for cleansing out infected tissues, and, as we know, the oxygen in these preparations is the effective agent. It is true also that they all contain mineral acids, but he did not think it possible that any of them contained enough to do any harm. He did not care to discuss formalin at this time, as it would be treated of in a coming paper.

Dr. BROWN, closing the discussion, said he was pleased with the nature of the discussion his paper had called forth. In answer to the question about the use of hydrogen dioxid in putrescent pulps and the value of such treatment, he would say that he had not used it in such cases depending on its continuous action, but merely for its immediate effect. In his opinion cleanliness is the essential thing in the treatment of wounds and those diseases which partake of the nature of wounds. If broken-down tissues can be removed and the fresh surface be kept clean, no germicide will be needed, and the less drugs that are used the better. He knew nothing that cleansed such parts as the dentists are called upon to treat so well as the subject of his paper. It does not matter whether hydrogen dioxid is a germicide strictly speaking or not. If it inhibits the growth of bacteria and makes their presence impossible, it is of no consequence whether the laboratory men call it a germicide or not. It does thoroughly and effectively what he requires of it.

He did not believe that in any considerable proportion of the antral troubles which we are called upon to treat the disease has its origin in any distant part. If an opening is made into the antrum so that all parts can be seen, and it can be thoroughly cleaned out and is packed with gauze, renewing the packing every day or two, the disease will be found to yield to treatment.

Dr. TAFT asked what was the specific or definite action of hydrogen dioxid in a wound or disease where there was a flow of pus. What does the reaction accomplish?

Dr. BROWN said he could not say exactly, but thought that the action of the oxygen destroyed the deleterious gases and cleared away the broken-down tissues, besides stimulating in a remarkable way the tissues to healthy growth and thus restoring the parts to health.

Dr. TAFT said that there had been remarks during the discussion that would lead one to conclude that some thought that this preparation should be applied to a putrescent pulp. He thought this would be very poor practice. The putrid matter should be removed mechanically. It should be cleaned out of the way as thoroughly as possible, and then the peroxid should be applied to destroy any traces that may remain; but, after all, germicidal, or, rather, disinfecting material, is necessary, and should be carefully applied in every pus-cavity and canal of the tooth. The bubbling of peroxid is produced by liberation of the oxygen, by combination and the formation of other gases, but chiefly by the escape of the nascent oxygen, which is in an exceedingly active condition and very readily combines with other substances and destroys their offensive character. It no doubt destroys micro-organisms by destroying the mediums upon which they thrive, and it also destroys the organism immediately. Many varieties of bacteria are doubtless destroyed by oxygen.

If a pulp-canal is thoroughly cleansed and the foramen is perfectly stopped, what does it matter if bacteria do form in the canal? There is this that may be said, that the contents of the tubuli may be affected, and doubtless are, in this way; that bacteria penetrate to a greater or less degree and produce mischievous results, but more perhaps is attributed to this than is ordinarily allowed, or, rather, than the facts will bear out. He hardly imagined that in ordinary cases the contents or organic matter of dentin will be very greatly affected throughout by the action of bacteria or organisms of this character, and, if they should penetrate, neither the application of the dioxid or even formalin would reach very far into the tubuli to come in contact with this condition of things.

There was no further discussion, and on motion adjournment was had till afternoon.

### *Afternoon Session.*

The Section was called to order at 2.30 P.M., Dr. Brown in the chair.

Dr. W. B. Hill, Milwaukee, Wis., read a paper entitled "Method of Teaching Materia Medica with Special Reference to Dental Students," of which an abstract follows:

The author called attention to the fact that his subject, like many others, presented two aspects, the real and the ideal. He maintained that in its highest sense dentistry should be, and is, a specialism in medicine. It was necessary for one entering the study of dentistry that his mind should have been trained in broad fields, so that concentration upon a single study shall not have the effect of dwarfing the intellect and narrowing his mind. The fundamentals should have been mastered early in his dental studies and his mind trained in grappling with the more abstruse problems in medicine, but he was obliged to concentrate his entire attention upon a portion of the oral cavity.

From the ideal point of view the question of "How much materia medica shall we teach?" would be answered, "All there is taught in the study of medicine." The obstacles which prevent the realization of this idea are lack of time in the curriculum, and lack of disposition on the part of the students. It has become necessary therefore to abridge work in materia medica as well as in anatomy and physiology, in order that there may be sufficient time for work in the dental laboratory.

For the average student the number of remedies in materia medica must necessarily be limited. The escharotics, the antiseptics, and those that are used particularly in their every-day practice, must of course have precedence, but there are many others whose actions have a remote influence upon the mouth and its diseases, which must also be taught. All of those affecting nutrition and assimilation have a direct interest to the dentist, and the art of prescribing should not be neglected as it sometimes is.

Having selected the few remedies we wish to teach, "What shall we teach about them?" should be our next concern. All that we know is hardly too much. Their pharmacology is essential, their constituents and chemistry should be taught, and their physiological action in its broadest sense should not be neglected: and then their therapeutic value in dentistry, as well as in medicine, should be the cap sheaf of our investigation.

The question of how shall we teach it is a much more difficult one. Teachers are born, not made, and each teacher must adopt a method adapted to himself. In my work I have found the pharmacology of a drug can best be taught by object lesson. The laboratory may be provided or improvised; it is only necessary that the student shall have an actual living acquaintance with the drug. The physiological and therapeutic action can best be taught by didactic lectures, wherein the student may partake of the enthusiasm of his teacher, and may be made to feel through that enthusiasm the effects of long and personal experience with the remedy, which will inspire him with confidence, a mighty adjuvant in the application of drugs. There is much, however, that should be eliminated from our lectures. The names, preparations, composition, chemical reaction, doses, etc., should be supplied in advance, that the student may commit them to memory, and have regular recitation and drill on them. This work should proceed or go hand in hand with laboratory work. I have never found a text-book which taught just what I wished to teach of any particular drug, nor one which treated only of those drugs which I esteemed of greatest importance to the student. I therefore have adopted a system of preparing skeleton notes which embrace those things that the student must commit to memory, and furnish mimeograph copies to each of the students, and leave for my didactic lectures that which I feel I could enliven by my personality.

Having familiarized himself with the pharmacology of a drug, the student now comes to the most interesting part of his study. He has been grounded in his physiology, his chemistry, and his pathology, and now he is enabled to see the practical applicability of this knowledge in the application of the remedies to diseases. After due consideration I have omitted to place upon my skeleton notes anything of the physiological action or therapeutics of a drug, because they are not to be memorized, but to be reasoned out. Just how a drug acts primarily upon one organ, and through some of the great systems of the body it results in a secondary action upon another organ, and drawing the parallelisms between the action of remedies and the pathological conditions in diseases, is as fascinating a study to the student in medicine or dentistry as is the illustrating of a natural law in physics. This is the logic of medicine.

In teaching therapeutics it is not sufficient to tell what disease may be cured and which harmed by the administration of a given drug; it makes a fascinating study for a student to take a disease, hunt out its etiology, trace down the pathological changes that take place, for the purpose of selecting a remedy that will overcome the conditions known to be present, eradicate the etiological factor, or to build up certain structures, in order to offset the destructive processes of the disease.

In my work this is still further supplemented by a course of applied therapeutics, in which we have the patient before us. We now can no longer follow the classical lines laid down in books, but must take diseases as we find them, modified by the various agencies that environ the human animal. The pathological conditions must here be studied out and remedies found that will logically supply the indications. If, perchance, in this course the student has witnessed diseases treated which are of little interest to him as far as he is concerned in his practice, he may have been given a lesson in mind culture that will serve him in good stead. The power of reasoning from effect to cause and back again to effect is the best mental discipline for cultivating practical minds.

### *Discussion.*

Dr. A. H. SAWINS, Denver, was highly pleased with the paper. He had had difficulty with dental students about the necessity of taking the regular course of materia medica with the medical students. He thought it would be more profitable for the dental students to have a special course in this branch, as time is so limited and laboratory work seems more necessary to dental students. In the Denver college the advisability of changing the plan had not yet been considered, though the matter may come up soon. Materia medica is very important to dentists, who should be prepared to give proper attention to cases of impaired nutrition brought on by the disorders of the digestive organs.

Dr. A. H. PECK, Chicago, thought the method of teaching materia medica as shown by Dr. Hill was very important. Materia medica is one of the most important studies in the curriculum, and the student who neglects this branch will seriously handicap himself through life.

Dr. J. TAFT, Cincinnati, said that while it is true that no student either medical or dental could have too much knowledge of materia medica, still it is quite as true that if a dental student gives his whole attention to this branch it would be too much for him. It is not necessary that the dental student should go all through and over the field of medical materia medica. He should have a general knowledge of materia medica at large, but the substances which enter into what is called dental materia medica he should have a thorough knowledge of, and their qualities should be thoroughly understood. Too much knowledge of the properties of every-day materials is not possible. In the profession at present there is a great ignorance about many of the drugs used. Ask a dentist what is the specific action of any drug, and you will probably fail to get a clear and thorough answer. This should not be so. Students and dentists should be thoroughly familiar with the qualities, powers, and action of every agent they use. It is true that the action of some drugs is obscure, but with close study the number of these will be less and less. A dentist who makes close study of drugs will be likely to use fewer medicinal agents as he gets a better understanding of them. He thought that in both medical and dental schools too much time is devoted to the history of medicines and their qualities outside of their usefulness in application.

Dr. HILL said he was uncertain when he wrote the paper whether he had better advocate the ideal of teaching, or whether to be content with what we usually find in dental schools, and he finally took a ground between the ideal and actual. Materia medica is a difficult subject to teach. It is a dry subject. It would not be so dry if we had a more modern pharmacopeia. But though it is dry, he protested against any one talking of a special course for dentists in materia medica. There can be no dental materia medica. Should a surgeon treating diseased conditions of the bones or soft tissues brought about by faulty nutrition say, "I will cut out the diseased parts, but will give no medicine; if medical treatment is necessary let the patient go to the medical man"? No, he should treat every need of the system, and if he cannot do this he should not do anything. So it is in dentistry; if you are going to teach a dental materia medica, what class of remedies are you going to throw out? To be prepared to do your duty you must be familiar with all. A dentist should know enough of the human system and enough of medicine to be prepared to treat any condition that does, or may, affect the organs of the mouth.

Dr. TAFT agreed with what Dr. Hill said. His contention was not that the dental student should not study every class of materia medica which would be of use to him as a dentist, but that he should not spend his time studying a great mass of matter which could be of no use at all. There is so much that a dental student must perfect himself in, that he cannot afford to devote his time to that which will be of no use to him.

(To be continued.)

## SOUTHERN CALIFORNIA DENTAL ASSOCIATION.

THE first annual meeting of the Southern California Dental Association was held in Y. M. C. A. Hall, San Diego, Cal., September 2 and 3, 1898.

The meeting was called to order at 2.30 P.M. by the president, Dr. W. A. Smith, of Los Angeles.

Dr. Emma T. Read, of San Diego, delivered the address of welcome, following which was read the president's address.

Papers were read by Dr. E. W. Sheriff, San Diego: subject, "How I Fill Root-Canals with Bibulous Paper Points"; and by Dr. Edgar Palmer, Los Angeles: subject, "Peridental Inflammation."

At the evening session a paper on "The Relation of Dentistry to Medicine" was read by Dr. P. C. Remondino, San Diego. Two papers on dental education were read, one by Dr. H. R. Harbison, San Diego, and one by Dr. E. L. Townsend, Los Angeles.

The morning of September 3 was devoted to clinics, at which the following clinical demonstrations were given: By Dr. H. R. Harbison, a quick mode of gold and silver plating for regulating appliances; by Dr. J. A. Cronkhite, Los Angeles, on anchorage in orthodontia, and a "chalk talk" by Dr. D. R. Wilder, Los Angeles.

At the business session the following officers were elected: Dr. W. A. Smith, Los Angeles, president; Dr. H. R. Harbison, San Diego, first vice-president; Dr. C. W. Sylvester, Riverside, second vice-president; Dr. J. M. White, Los Angeles, treasurer; Dr. L. E. Ford, Los Angeles, secretary.

Dr. George H. Cushing was elected to honorary membership, and over fifty members of the profession signed the roll of membership. The new association starts under most favorable auspices and with bright prospects, its first meeting representing the largest gathering of dentists ever held in Southern California.

The next meeting will take place at Los Angeles the first Tuesday in October, 1899.

L. E. FORD, *Secretary*,
Los Angeles, Cal.

## NEW YORK BOARD OF DENTAL EXAMINERS.

AT the annual meeting of the New York State Board of Dental Examiners, held at the Regents' Office, Albany, October 1, 1898, the following officers were re-elected: S. B. Palmer, president; Frank French, secretary; Wm. Carr, editor.

## ALUMNI ASSOCIATION, BOSTON DENTAL COLLEGE.

FOLLOWING are the officers for 1898-99: William P. Hanston, Boston, president; William Barker, Providence, R. I., and Clarence J. Wolf, Boston, vice-presidents; M. L. Woodward, 2 Commonwealth avenue, Boston, secretary; William Rice, Boston, treasurer; G. B. Harriman, Boston, F. S. Faxon, Brockton, J. F. Allen, Campello, F. S. Fogg, Roxbury, executive committee.

## BOARD OF EXAMINERS DENTAL ASSOCIATION OF THE PROVINCE OF QUEBEC.

On September 21, 1898, the following officers were elected to serve three years: E. B. Ibbottson, president; Jos. Nolin, vice-president; E. Dubeau, secretary; F. A. Stevenson, treasurer; W. J. Kerr, registrar; J. G. Gardner, G. E. Hyndman.

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# DENTAL SOCIETY ANNOUNCEMENTS.

## NATIONAL SCHOOL OF DENTAL TECHNICS.

The sixth annual meeting of the National School of Dental Technics will be held on the 28th and 29th of December, 1898, in the club-rooms of the Grand Hotel, Cincinnati, Ohio, beginning promptly at 10 A.M. The preliminary program is as follows:

*First Day.* 10 A.M. Organization, and reports of Executive Board. President's address. G. V. Black, D.D.S., M.D., Sc.D.

Discussion opened by Drs. Guilford, Brophy, and H. A. Smith.

2 P.M. "The Value of a Graded Course of Study and Uniformity among Dental Students." Dr. G. V. I. Brown, dean of Milwaukee Dental School.

Discussion by Drs. M. T. McLean, E. C. Kirk, J. Taft.

8 P.M. Report of Committee on Syllabus for Prosthetic Technics. By Dr. N. S. Hoff.

Discussion by Drs. G. Molyneaux, J. H. Lewis, J. G. Harper, H. B. Tileston.

Report of Committee on Syllabus for Operative Technics. By Dr. T. E. Weeks.

Discussion by Drs. J. A. Dale, J. F. Stephan, W. G. Foster, L. S. Tenney.

*Second Day.* 10 A.M. Symposium of Teaching Methods: (1) Conduct of the Operative Clinic. Dr. W. H. Whitslar; (2) Text-Books and Recitation Methods. Dr. C. M. Wright; (3) Lecture and Class Methods. Dr. H. H. Burchard; (4) General discussion.

2 P.M. Steel Technics. Dr. George E. Snow.

Discussion by Drs. G. H. Wilson, J. D. Patterson, G. V. Black.

4 P.M. Teaching Cavity Preparation. Dr. C. N. Johnson.

Discussion by Drs. W. E. Harper, J. H. Daly, D. M. Cattell, W. J. Brady.

8 P.M. (1) Voluntary Papers; (2) Election of Officers; (3) Adjournment.

The profession is cordially invited to attend.

D. M. Cattell, *Sec'y-Treas.*
Grant Molyneaux, *Master of Exhibits.*

## TRI-STATE DENTAL ASSOCIATION.

On October 24, 1898, there was organized at Carmi, Ill., an association of the dentists of Indiana, Kentucky, and Illinois, under the name of the Tri-State Dental Association. The officers elected were as follows: C. M. Meade, Carmi, Ill., president; S. F. Guilmore, Princeton, Ind., W. H. Broseman, Albin, Ill., L. A. King, Henderson, Ky., vice-presidents; R. H.

Burks, Shawneetown, Ill., secretary; A. J. Hovey, Mt. Vernon, Ind., treasurer; F. J. Raymond, Evansville, Ind., editor; M. M. Haas, Evansville, Ind., purchasing agent.

It is the intention to make this the largest dental society of the South and West. At each meeting clinics will be given by some of the best men in the profession, and the latest and most approved methods demonstrated. The next meeting will be held at Henderson, Ky., on the second Tuesday in May, 1899. An interesting program is nearly completed.

L. A. KING, *Chairman Exec. Com.*

## PENNSYLVANIA BOARD OF DENTAL EXAMINERS.

THE Board of Dental Examiners of the State of Pennsylvania organized in Harrisburg, October 1, 1898, by electing Dr. Henry Gerhart, of Lewisburg, president, and Dr. G. W. Klump, of Williamsport, secretary.

The next examination of applicants for license to practice dentistry in Pennsylvania will commence December 6, simultaneously in Philadelphia and Pittsburg.

Applications to the Dental Council, Harrisburg, should state in which city the applicant desires to be examined.

G. W. KLUMP, *Secretary.*

## ISAAC KNAPP DENTAL COTERIE.

FOLLOWING are the officers for 1898 of the Isaac Knapp Dental Coterie: Dr. W. W. Mungen, president; Dr. R. S. Viberg, secretary; Dr. J. E. Waugh, treasurer.

The meetings are held at the respective offices of its members, on the second Thursday of each month, and election on the second Thursday in January.

R. S. VIBERG, *Secretary.*

## SOUTHERN KANSAS DENTAL ASSOCIATION.

THE Southern Kansas Dental Association will meet in Wichita, December 27, 28, and 29, 1898.

U. S. HAUGLAND, *Secretary.*

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# EDITORIAL.

## MENE, MENE, TEKEL, ETC.

IF the editor of the *Dental Digest* will consult Daniel v. 26 and 27, he will discover the interpretation of the quotation which heads this communication; the reason for its selection we shall endeavor to make clear. In the October DENTAL COSMOS we criticised what we believed to be certain defects in the executive management of the affairs of the National Dental Association. We likewise asked for more light on the action of the Executive Committee of that body in opposing a national legislative enactment apparently conceived in the best interests of the whole dental profession of this country. The result of that criticism is, under the circumstances, about what was to have been expected, for it raised a question as to the autocratic supremacy of one man in the control of the affairs of our National body. Our criticism, it now seems, was also an interference with his private business interests as the promoter of a dental supply concern, hence the character of his editorial explosion.

We have read his editorial in the March *Digest*, to which he refers, and likewise his October effusions, and they strike us as all being of the same cloth and texture. In each of them the main issues are evaded, none of the points at issue are squarely met, and instead of a frank and clear putting of the case we are treated to a tirade of abuse and innuendo respecting the business methods of The S. S. White Dental Mfg. Co. Even were his charges and implications true, which they are not, they are apart from the issue. The business methods of The S. S. White Company are not on trial in this case, but the business methods of the chairman of the Executive Committee of the National Dental Association, and those interested will not be diverted from the consideration of the latter by such transparent devices as the editor of the *Digest* has resorted to in his October editorials.

We freely and heartily accord to the chairman of the Executive Committee all the honor and credit which is his due for the laborious work he has done for our National Association in the past, and for his noble work in organizing and making effective the Dental Protective Association. No one appreciates more than the editor of this journal the value of that work, or is more willing to accord its promoter the honored position which he has won as a professional benefactor. But the handwriting is already on the wall which announces that even one who has served his profession unselfishly for a long period of years cannot carry water on both shoulders. And further, that a debt of professional gratitude cannot be liquidated by commercial methods. The suspicion has gained currency among thinking members of the profession that the meetings of the National Association are being utilized to alloy that body and the Dental Protective Association in a fellowship amalgamation with the Dental Protective Supply Company for commercial ends, and that the supply business of the chairman of the Executive Committee is a growing factor in his society interests.

The editors of at least two reputable dental journals have publicly advised the chairman, for the best good of the association, to abdicate and devote his energies to his trade interests. Certainly this advice is not given in an unfriendly spirit, and is free from the suspicion of malice or of self-interest, and, as it is logical and consistent, should be heeded.

The editor of the *Dental Review* (September issue, p. 721) says,—

> "One of the dramatic things happened at Omaha when Dr. J. N. Crouse placed his resignation as a member of the Executive Committee before the meeting. He said that the president told him he ought to resign, and therefore he did it. Some one moved that the resignation be laid on the table, which was done. Not more than four or five voting out of thirty-five or forty present. We think he should have persisted and resigned. There are others fully competent, and they are not running dental depots. It is a very embarrassing position for a dental dealer to be directing the business affairs of a dental association, and we wonder why the doctor does not step aside. Such a feeble indorsement as he got at Omaha is not very encouraging. No one is more willing to accord praise to him for his work in the D. P. A. than the writer, but now that he has personal, public interests in the dental supply business he ought to leave the matter to the judgment of his friends and retire from such conspicuous society work and stay in the ranks. We feel sure that the association would do better to have an outsider do its business. The meeting this year was not a success numerically or from a literary standpoint, due, as we have said, to the dilatory methods of the Executive Committee. If the next year is not better managed or advertised we will feel called upon to criticise the Executive Committee more severely than we have in the past. We are for the success of the National Dental Association first and last, and men can take care of themselves."

And the editor of the *Dental Practitioner and Advertiser*, October issue, p. 166, says,—

> "Dr. J. N. Crouse, who has for so long a time been chairman of the Executive Committee, was moved by some sense of propriety to tender his resignation. But the usual super-serviceable young man, who may always be trusted to do the wrong thing, was on hand to move that it be laid upon the table. No one cared to perform the ungracious task of opposing this, and so only half a dozen voices were heard when the vote was taken. Dr. Crouse accepted the vindication. We think he made a mistake. Let no one misunderstand us. He has been the backbone of the 'American' for many years, and has been more efficient than almost any other man could be in that place. But now the circumstances are greatly changed. Many can remember the time when he fiercely attacked any exhibition of the influence of the dental depots in our professional societies, and declared that the mercantile element was necessarily injurious. He is now the proprietor of a dental depot himself, and the spectacle of a representative of the manufacturing and trade interests dominating the action of our National Society is not an inspiring one. Personally he is no worse and no better than he was when his interests were wholly

on the professional side. His judgment has not failed, his zeal has not abated, nor has his ability to work diminished. But nevertheless there is an incongruity in his present relations that he should be the first to discover, and that should not have been forced upon his observation. They were not his enemies, but his most judicious friends, who counseled his resignation."

These put the question in a nutshell, and it is because of the conditions alluded to that a considerable number of practitioners are wondering why the suggestion is not acted upon.

We pass by the fulsome allusions to the comparative merits and magnitude of the work done by the editor of the *Digest*, for the reason that we think it would have done more credit to his modesty to let others judge of that matter for themselves.

As to his suggestion regarding a refrigerator car for the transportation of delegates, we are not sure that it would not be a good idea, for it might afterward be sidetracked at Chicago and used as an editorial sanctum for the *Digest*, and thus secure the production of editorial matter at a lower temperature and a corresponding increase in reasonableness.

Finally, let us suggest that the time has not yet been reached when the acts of a public official are or should be exempt from honest criticism,—a fact which the editor of the *Digest* should recognize as applying to his own as well as to others.

## BIBLIOGRAPHICAL.

ANATOMY AND HISTOLOGY OF THE MOUTH AND TEETH. By I. NORMAN BROOMELL, D.D.S., Professor of Dental Anatomy, Dental Histology, and Prosthetic Technics in the Pennsylvania College of Dental Surgery, Philadelphia. With 284 illustrations. Philadelphia, P. Blakiston's Son & Co., 1898. Price, cloth, $4.50.

Preliminary announcement of this work appeared in our previous issue.

For some time past various articles by the author on subjects relating to dental anatomy and histology have appeared in the DENTAL COSMOS, and have embodied much fresh thought and excited interest because of the clearness of delineation presented by the original illustrations which accompanied them.

The results of this previous work, as well as much additional labor, are now gathered into permanent form in the book before us.

As a book its most striking features are its beautiful illustrations and the clearness and excellency of its typography, two factors which are not always given the consideration they deserve, and which contribute not a little to the usefulness of our textbooks. On these two points nothing but high commendation can be accorded the present volume.

Much difference of opinion exists, even among experts, as to the relative merits of the half-tone photographic process and the wood engraving for the delineation of anatomical subjects, and especially of the topographical anatomy of tooth-forms. Dr. Broomell has, we think, demonstrated the force of his contention that the photographic process has superior value in the connection noted over wood engraving, as it gives not only a faithful portrayal, but one free from any suspicion of influence due to the personal equation.

The general plan of the work includes an exposition of all the topics which we think may be properly embraced by the limits of the title. There are certain features which we believe need fuller exposition and in some cases correction.

For example, page 17, in describing the boundaries of the oral cavity, that space is said to be bounded "posteriorly by the fauces." Again, it is stated that "the entrance to the cavity of the mouth is formed and controlled by a freely movable transverse orifice, or slit, the buccal orifice."

Page 19, in the description of the mucous lining of the alimentary tract, no distinction is made between those portions which are of ectodermic and those of entodermic origin.

Page 21, the action of the orbicularis oris is imperfectly, and, we believe, incorrectly described. The levator labii inferioris is omitted, as well as the depressor labii superioris, in the description of the muscles of the lip. In the blood-supply to the lips, page 23, mention of the submental artery, a continuation of the facial, is omitted. In all the descriptions of the course of the blood from the heart to the lips, teeth, tongue, etc., mention of the innominate artery is omitted, so that the description given is correct only for the left side of the body. In the description of the nerves of the lips, no distinction is made as to motor and sensory nerves.

Page 25, the principal action of the buccinator muscle is omitted and a wrong function accorded to it, namely, "to draw outward or backward the angles of the mouth, thus enlarging the buccal orifice." The description of the nerves of the cheeks omits mention of the nerves of sensation; likewise, in relation to the nerves of the soft palate, page 34, it is stated that they are "all sensory," in which event we fail to understand how their motor function is initiated.

The blood and nerve supply to muscles of the soft palate are not described; of the palato-pharyngeus, its action is said to constrict the opening of the fauces. We would ask, Is not this muscle an elevator of the pharynx?

In describing the osseous framework of the floor of the mouth, no reference is made to the hyoid bone.

Of the tongue it is said, "Its special function is that of speech." What about the possibility of articulate speech after ablation of the tongue? In the illustration on page 78, showing the evolution of the mandible, that of the child not over six years of age is designated as the mandible of a "youth." The term is not sufficiently limited.

The description of the pterygoid muscles, page 88, is inadequate and misleading. The importance of the function of these muscles of mastication, and consequently the importance of a clear and intelligent understanding of their anatomy and function by the dentist, requires a much more extended and accurate treatment in a special work of this character. In the description of the inferior maxillary nerve, page 117, it is said that "it arises from the Gasserian ganglion." This statement is true only as regards the sensory portion.

We note an error in the authorship of a number of illustrations which are credited to Geise. We presume Gysi to nave been intended.

The section dealing with the anatomy and histology of the pericementum is wholly inadequate in view of the importance of that tissue and the exhaustive studies of it that have already been made by Dr. Black.

We regret that the adherence of the author to anatomical standards of nomenclature has led him to retain the use of superior and inferior as designating the positions of teeth, rather than the simpler and less ambiguous terms upper and lower. We are quite aware that he has the justification of ample authority for the terms noted, but superior and inferior, as designating position when applied to all structures other than the teeth, are not open to the ambiguity of meaning which they possess as applied to the teeth. Since differences of quality in tooth-structure are so freely discussed, teeth of inferior grade or superior quality are frequent expressions, and hence superior and inferior as applied to teeth are terms which indicate degree as well as position. It would appear better therefore to describe tooth position by terms which are capable of but one interpretation, and relegate the ambiguous terms superior and inferior to other uses.

In view of the recent controversies as to the exact mode of nutritive supply to the dental pulp, it would have seemed desirable that the mode of entrance of the vascular supply to the pulp had been fully described, though the illustration (Fig. 49) probably shows it exactly.

These are features which detract from the work as a whole, and they will no doubt be corrected in a future edition. The plan is excellent and its mechanical execution faultless. With a careful revision it is the kind of book which should form the basis of teaching for the special department of anatomy which it represents.

GOULD'S POCKET PRONOUNCING MEDICAL DICTIONARY. Philadelphia, P. Blakiston's Son & Co., 1898. Price, flexible leather binding, $1.00.

The new edition of this pocket lexicon is a marked improvement in every respect upon its predecessors. The number of words included has been almost doubled and many words new to medicine have been added, while unnecessary and obsolete terms have been omitted.

Certain features of the work are worthy of special notice: The simple and practical system of pronunciation; the concise definitions; the large percentage of words specially pronounced; the restriction of the words included to those most used in medicine; the many valuable tables which it contains; lastly, the construction of the work itself, involving a convenient size rendered possible by the use of specially made thin paper, narrow margins, the exclusion of rare and obsolete words, etc., reducing the bulk so that it may be properly called a Pocket Dictionary.

The wide experience of its author as a medical lexicographer has made possible the production of a series of dictionaries which are rapidly becoming standard authorities throughout the world.

We know of no work which in so small a compass contains so much that is reliable and accurate in the same field for the practical uses of the medical and dental student.

## PERISCOPE.

EUCAIN A IN DENTISTRY.—In the dental department of Professor Bobrow's surgical clinic—from October, 1896, to October, 1897—we performed 745 dental operations under the following conditions:

| | |
|---|---|
| Without anesthetics | 205 |
| Under cocain anesthesia | 220 |
| (One Pravaz' syringeful of 2 per cent. sol.) | |
| Under eucain anesthesia | 320 |
| (One Pravaz' syringeful of 5 per cent. sol.) | |

In extractions without anesthetics, nervous disturbances in the form of slight giddiness (one of actual fainting) were observed in fifteen persons, which equals 7.3 per cent. of the cases under observation. In extractions under cocain we observed by-effects ranging in severity from slight giddiness to marked cocain-poisoning in 103 of the cases, equal to 46.8 per cent. In extractions under eucain, however, out of 320 patients treated, only eight, or 2.5 per cent., seemed slightly dazed. In reviewing these figures an enormous difference is to be observed in the number and severity of the affections of the nervous system caused respectively by cocain and eucain. When we consider that in extractions without any anesthetic, slight by-effects were observed in 7.3 per cent. of the cases treated—these by-effects being attributed to acute irritation of the sensory nerves and to physical excitement and fear of the operation—we cannot help concluding that with eucain anesthesia not only are these by-effects not increased, but are even reduced in number by two-thirds.

General by-effects after eucain anesthesia were only noticed in 2.5 per cent. of the cases; and these may doubtless be regarded as ordinary consequences of the purely physically excited condition of the patient during the operation, seeing that, in the few cases in which nervous disturbances were observed, they appeared during the injection of the anesthetic, or so quickly after the same (half a minute) that the assumption that eucain had already been assimilated, and caused poisonous symptoms, is quite out of the question. Even in those cases where nervous disturbances did take place, they were confined to a slightly dazed condition, which rapidlv disappeared in the short space of three to five minutes.

The poisonous symptoms which some authors who have made pharmacological and physiological experiments with eucain have reported, have not in the slightest degree been experienced by us. The comfort and confidence which the physician feels owing to the non-toxicity of eucain can only be appreciated by those who have experienced but one case of cocain-poisoning, such as may happen even when weak solutions are used.

As an illustration, the following case may be given: On the 5th February, 1897, a lady came to us to have a tooth extracted, but requested an absolutely painless operation. We found on examination extended caries of the lower left premolar, with a chronic inflammatory condition at the root of the tooth. As there was no reason for not using cocain, we injected 15 minims of a two per cent. solution into the gums, after which we removed the tooth painlessly. First of all the patient was all right; five minutes afterward, however, she complained of giddiness, followed by alarming syncope; the face was covered with clammy perspiration, pulse was accelerated, pupils were dilated, breathing became slower and superficial, at times completely stopping, and an inclination to vomit was experienced. In spite of all our efforts the condition lasted for a quarter of an hour, during which period we had several times to resort to artificial respiration, after which the patient began slowly to recover, but had frequent relapses, becoming stupefied, respiration affected, etc., and we had again to resort to artificial respiration.

At last, after an hour had elapsed, the patient came round completely, began to notice her surroundings and to answer questions, respiration became more regular, but the general weakness remained. After a further hour, the patient had so far recovered that we could let her go home without fear. A few days later we heard that in the evening, ten hours after the cocain injection, the patient had another serious relapse, necessitating calling in medical aid. From what we heard, the symptoms were the same as those observed in our clinic, and it took the medical attendant two to three hours before he was able to get the patient all right again. Of course, we had here to do with an extraordinary case, but we cannot say that some of the other cases which we observed in our clinic were of much less severity. The cases under our notice varied considerably in severity, ranging from a slight giddiness and discomfort in the region of the heart to symptoms of the severity above described. We might here mention that opinions differ as to the dosage of eucain, some considering one-fifth grain as the maximum, while others give as much as one and a half grains. As above mentioned, we always use a dose of three-quarters of a grain, which we reduce to half a grain if the age be from twelve to sixteen years; in some cases, however, we have increased the dose to one grain without observing the slightest ill-effects.

We injected the eucain solution by means of a deep puncture in the gums on each side of the tooth to be extracted.

A disadvantage complained of with eucain is the swelling observed at the point of injection, which, however, is very small and painless, and we therefore do not attribute any importance to it; this swelling, however, does not appear with every patient, which led us to believe that it was caused by an insufficient sterilization of the syringe. This assumption, moreover, seemed confirmed by the fact that although we only prepared small quantities of the solution, which were sterilized by boiling before use, still we had to introduce the syringe, which had been used several times, into the solution.

In order to determine this point, bacteriological experiments were carried out with solutions of different ages. As culture-grounds we used glycerol agar, gelatin, and beef tea; but we did not succeed in a single case in getting growths. In order to determine whether the syringe or the needle made the solutions impure,—we may here mention that the needle before being used was always boiled and a five per cent. carbolic solution passed through it,—we dropped solutions of eucain upon the above-mentioned culture-grounds through the needle in the same manner as if we were injecting it into the gum, but failed to get any positive results.

On the basis of these observations we must come to the conclusion that the swelling caused by eucain in the gum is the result of a specific influence upon the tissue, and that it does not act with the same virulence upon all persons.

Some authors maintain that injections of eucain cause a burning or pricking pain in the tissues; we confess that we have no experience in surgery of the eye, throat, nose, or urinary tract, and hence cannot contradict these statements as far as these parts are concerned; but we can maintain with certainty that the injection of eucain solution into the gums is only followed by a slight and quickly-passing-off pain, when there is a slight chronic periostitis, or when the gums have become tender. In all other circumstances the injection is absolutely painless, or at least not more painful than with cocain.

There can be no doubt that eucain dilates the blood-vessels, and hence a little more hemorrhage occurs than after the use of cocain, but we do not attach any importance to this, as the bleeding takes place after the operation, thereby not inconveniencing the operator. As the result of our observations we have come to the conclusion that the disadvantages belonging to eucain as a local anesthetic are amply superseded by its doubtless advantages, and that eucain is preferable to cocain, especially in stomatology.

We must not forget that cocain-poisoning (we need only mention again the case referred to above) is always an unpleasant probability. This makes the administration of cocain a very responsible undertaking, the more so in such a small matter as the extraction of a tooth. Besides, it is well known that the poisoning symptoms of cocain appear very rapidly, and in an acute form, often immediately after injection. It matters not whether the poisoning is due to the rapidity with which cocain is absorbed or to the closeness of the central nervous system, the fact remains that cocain is highly poisonous in comparison to eucain. Owing to this toxicity of cocain, many operators have rightly refrained from using a local anesthetic in tooth-extractions. Again, other anesthetics are more troublesome and inconvenient to use, and are not without risk. Ethyl bromid is so unpleasant to the patient that it seems almost better to extract the tooth without anesthesia.

Thorough anesthesia is certainly desirable for the patient as well as the operator, because the heavy physical strain is thereby avoided; and in many cases patients only make up their mind to have the operation performed provided you can convince them that it will be painless; even in cases where immediate operative treatment is required,—*e.g.*, in chronic periostitis, commencing necrosis, etc.; moreover, the operator can perform so much better when an anesthetic is employed. All this is of great importance to the operator, the patient, and the ultimate progress of the case; and perhaps in no other branch of surgery are so many errors possible as in dentistry. The pain is severe, the patient is frightened and fidgety, the operator has to hurry, and is apt to excite himself,—the result of this being an unfinished operation and a broken tooth. Further, the patients dread the necessity of undergoing all these tortures again, especially as they fear that the second operation will not be more successful. In this way develop —that which we can daily observe—neglected conditions of disease of the jaw, the cure of which is not at all an easy matter.

From the foregoing we conclude that eucain is a good local anesthetic, the employment of which, when given in the proper doses, is absolutely harmless.—*A. Saloga, in The Therapist.*

# HINTS, QUERIES, AND COMMENTS.

We quote the following from the November issue of the *Penn Dental Journal:*

"A New Dentinal Obtundent.—A new candidate for favor as a dentinal anesthetic is just now undergoing the experimental stage, with promise thus far of a high degree of efficiency. The preparation is a product of the chemical laboratory of McKesson & Robbins, 91 Fulton street, New York, and is termed vapocaine. It consists of a fifteen per cent. solution of cocain hydrochlorid in ethyl ether.

"The production of such a solution is by no means the simple problem which it might at first glance appear to be, as under ordinary circumstances cocain hydrochlorid is practically insoluble in ether. The efficiency of cocain as a dentinal anesthetic has heretofore been unavailable for several reasons, all of which are the result of the lack of a satisfactory method for securing the penetration of cocain salts into the dentinal structure. Aqueous solutions of cocain salts fail to penetrate the dentin, because the difference in density between them and the fluids of the dentinal tubuli is too slight to create the conditions for rapid diffusion. The ethereal solution of the cocain alkaloid is deficient in anesthetic property. The production of an ethereal solution of a cocain salt secures a preparation possessing not only anesthetic properties, but also the difference in density relative to the fluids in the dentinal tubuli necessary for rapid diffusion.

"The action of vapocaine as explained by the manufacturers is as follows:

"They have found that if the end of a capillary glass tube be placed in contact with a pledget of cotton, saturated with water, colored with anilin, the anilin solution will rise by capillary attraction to a considerable height in the tube. If now a pledget of cotton, saturated with vapocaine, be applied to the opposite end of the glass tube and the whole arrangement be gently heated over a water bath, the ether solution carrying with it a certain amount of the cocain salt rapidly penetrates the tube, driving the anilin solution out and displacing it. In a short time, however, evaporation of the ether takes place, leaving a deposit of the cocain salt as an incrustation on the inner walls of the capillary glass tube throughout its entire length, after which, the diffusive factor of the ether having been eliminated by the evaporation, the anilin solution is again drawn into the tube by capillary attraction, dissolving in its passage the incrustation of the cocain salt from the walls of the tube.

"It is believed that the result of the application of vapocaine to the open ends of the dentinal tubuli in a carious cavity is analogous to that described in the foregoing experiment with the glass tube, with the further result that the solution of the cocain salt deposited in the dentinal tubuli by the natural fluids of the tooth exerts the well-known physiological anesthetizing effect of cocain on the sensory elements of the dentinal fibrillæ. A limited number of tests in the clinic in the operative department have yielded remarkably satisfactory results on hypersensitive dentin. The subject is one of very great importance; and, as the investigation of this interesting preparation will be continued until its value or otherwise has been fully established, we hope to present more definite data and some conclusions in regard to it in a future issue of the *Journal*."

While the foregoing is simply a tentative report, it contains certain interesting and suggestive features. As was pointed out in this journal some time ago, the barrier to the effective use of cocain as a dentinal obtundent was the comparative impenetrability of dentin. It was this obstacle to the use of cocain which cataphoresis was believed to have overcome. If the practical tests of this ethereal solution of cocain hydrochlorid should demonstrate that the ingenious theoretical explanation as to its mode of action were correct, the necessity for the cataphoretic introduction of cocain would be avoided.

The advantages of a simple topical application over the complicated cataphoretic method are apparent, and we shall await further reports on the clinical tests of vapocaine with interest.—Ed. Dental Cosmos.

[Since the foregoing was written the following additional information as to the diffusibility of vapocaine has been received from the chemical expert of McKesson & Robbins, which is of much interest as bearing upon the method of action of this preparation:

"We have been conducting some experiments with a view to determining whether, when vapocaine is subjected to dialysis, the cocain hydrochlorid will pass from an ethereal into aqueous solution. Our experiments show that in a very short time almost the whole of the cocain hydrochlorid will pass through the dialysing membrane into the water. Further, there is osmosis of the water into the ethereal solution and but little in the opposite direction."]

To the Editor of the Dental Cosmos:

*Sir*,—I feel it my duty to the profession to tell something of my experience with oil of cinnamon as a root-dressing. I have been using it for the last four years to the exclusion of everything else in a country practice, the exigencies of which make it almost imperative that I should practice what is known as "immediate root-filling." I might write a magazine article on it if I were not too lazy and perhaps a little diffident on account of having no diploma.

In the first place, the oil of cinnamon is what my druggist calls the "true oil of cinnamon." It is extracted from the bark, and must not be confounded with the oil of cassia, which is obtained from the cassia bud. There is no comparison between the two oils. The veriest tyro could tell that one was a hundred times more powerful than the other.

In my ordinary practice, where I can apply the rubber-dam I prepare the root with sulfuric acid and soda (sodium and potassium would probably do as well), dry thoroughly with hot air, place a small wisp of cotton saturated with the oil in the extremity of the canal, stop the canal with gutta-percha and fill. If there is an active abscess at the apex of the root, I give the patient instructions how to make and apply a fig poultice to the gum. Of course, if the face is badly swollen, and the tooth in the condition popularly called "ulcerated," I treat and reduce that before filling.

But my most remarkable experience has been in those cases where it was impossible to use the dam. These I simply excavate and disinfect as best I can, which in many cases is almost not at all; then almost fill the pulp-canal with cotton saturated with the oil, put an amalgam filling right on top of it, and let them go. Now this sounds preposterous I know, and the first time that I tried it I had no idea of success. I am not going to tell you of the per cent. of success, for that would sound still more preposterous. Just try it yourself, and you will say that oil of cinnamon is the most remarkable antiseptic.

I will give you just one instance. In the little envelope inclosed is the pulp of a central incisor the history of which is as follows:

Miss A. came to me with an alveolar abscess apparently arising from a cuspid; the abscess was lanced, and, while waiting for the swelling to subside, the first bicuspid caught the disease. Then in spite of all my efforts the lateral and then the central went the same way. In my desperation I extracted the lateral, which at the time seemed to be the center of activity. I contented myself with simply drilling the central, and got a good flow of pus from the canal. After a long siege, my patient recovered with the other three teeth still in the mouth. After drilling the hole in the central, I placed a loose tamp of cotton with oil of cinnamon on it to keep it disinfected as much as possible. I instructed the patient to come as soon as possible and have the teeth fixed up, but she didn't get here for a year. I expected to find something pretty rank in that central, as it had been a year with no stopping but that loose cotton and cinnamon. What was my surprise to find there this pulp with just a faint odor of cinnamon. That is the whole story, and is what has prompted this letter. Yours truly, ——.

[We publish the foregoing communication because of its intrinsic interest. It is a private letter, and the writer, while assenting to its publication, desires that his identity shall not be disclosed.

The specimen of mummified pulp removed from the case of "Miss A," as described, is in a thorough state of preservation.—ED. DENTAL COSMOS.]

TO THE EDITOR OF THE DENTAL COSMOS:

*Sir*,—In the November issue of the DENTAL COSMOS, pages 920-923, I find an article and illustrations thereof on "Removable-Facing Crown- and Bridge-Work," by H. W. Howe, D.D.S., City of Mexico. As the original inventor of ninety per cent. of all that is shown in the illustrations, I have some objections to their going before the profession under an obvious intimation, if not a direct claim, to the authorship of the invention, system, or method. It would have at least looked much better had the author refrained from using illustrations of the instruments of my invention (Fig. 9), which have been on the market under my name for the past four years. Every other illustration shown except his Figs. 6, 7, and 10 is shown in my patent No. 468,761, of February 9, 1892, and also published in the DENTAL COSMOS by me in April, 1891, pages 262-268,—"Removable Bridges, Crowns, and Facings." In ending up the article my friend says "he has been using this method since 1891." If one will take the trouble to look up the date of my application for patent on this same work, he will find that the application was filed in the Patent Office December 12, 1890, so his giving that date appears dangerously like an effort to claim previous date to both my patent and article of 1891 and 1892, respectively. I showed this work to a great many of the leaders in our profession in the East, New York and Boston, in 1890, and have every feature of the work in practical use in the mouth of my patients since early in 1889.

EMORY A. BRYANT, D.D.S.

WASHINGTON, D. C., November 14, 1898.

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COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

**Flörke** (G.) Der Einfluss der Kiefer und Zähne auf den menschlichen Gesichtsausdruck. Eine anthro-pologisch-ethnographische Studie. Bremen, 1898, J. Frese, 96 p. 8°.

**Hohenwald** (Ernst.) Verhütung der Zahnkrankheiten. Gemeinverständliche Anleitung zur naturgemässen Erhaltung der Zähne, der Schönheit des Antlitzes und der Gesundheit der Verdauungs-organe. Berl., 1898, Hohenwald, 72 p. 8°.

**Johannsen** (G.) Die Zähne ihre Pflege und Erhaltung. Riga, 1898, Jonck & Poliewsky, 15 p. 8°.

**Revista** (La) dental Mexicana. Periodico mensual dedicado al adelanto de la ciencia dental. Publicado por la Compañia Manufacturera Dental Mexicana, Mexico, D. F. Nos. 1-4, v. 1, 1898.

---

**Abstract** of the report of the committee on Foreign Relations of the National Association of dental faculties. Dental Cosmos, Phila., 1898, xl, 822-831.—**Acosta** (E.) La rabia; consejos que no deben olvidarse. Rev. dent. Mex., Mexico, 1898, i, 248-251.—**Allen** (W. A.) Pyorrhea alveolaris. Items Interest, N. Y., 1898, xx, 728.—**Armstrong** (G. E.) Operative treatment of cancer of the tongue. Maritime M. News, Halifax, 1898, x, 325-329.—**Arrington** (B. F.) A lost art resurrected and dental science progressing. Dental Brief, Phila., 1897-8, iii, 188. ——— Controversias con relación á la pyorrhea alveolaris. Rev. dent. Mex., Mexico, 1898, i, 107-110.—**Ault** (M. F.) Preliminary and graduating requirements; the logical standard. Dental Reg., Cincin., 1898, lii, 465-468.—**Barker** (D. W.) Methods of using amalgam. Items Interest, N. Y., 1898, xx, 830-832.—**Beacock** (D. V.) Disease and the evolution of medicine. Dominion Dent. J., Toronto, 1898, x, 303-312.—**Beers** (W. G.) A contribution to the amalgam question. *Ibid:* 312-315.—**Belcher** (H. L.) Associate lesions of the first dentition. Internat. Dent. J., Phila., 1898, xix, 641-645.—**Bethel** (L. P.) Nature's methods of defense. Ohio Dent. J., Toledo, 1898, xviii, 473-477.—**Blake** (A. E.) A case of fracture of both superior maxillary bones. Pacific Medico-Dent. Gaz., San Fran., 1898, vi, 454-456.—**Block** (R.) Aus Zahnärztlicher Landpraxis. und die dabei gemachten Erfahrungen über Localanästhesie bei Zahnextractionen. J. f. Zahnheilk., Berl., 1898, xiii, no. 35.—**Bogle** (R. B.) Report of a case of abscessed antrum. Dental Headlight, Nashville, 1898, xix, 175-178.—**Bonwill** (E. W.) Abscess of the antrum and the danger of leaving tubes in too long. Dental Brief, Phila., 1897-8, iii, 127.—**Bonwill** (W. G. A.) Reminiscences of a European trip to the International Medical Congress at Moscow, Russia, August 19-26, 1897, as a delegate from the American Medical Association and the Odontological Society of Pennsylvania. Internat. Dent. J., Phila., 1898, xix, 646; 707.—**de Bovis** (R.) Sublinguites (grenouillettes inflammatoires). Union méd. du nord-est, Reims, 1898, xxii, 289-294.—**Brosius** (F. A.) Dr. Jenkins new porcelain enamel. Ohio Dent. J., Toledo, 1898, xviii, 505-507.—**Brown** (L.) A method of replacing porcelain faces on crowns or bridges. J. Brit. Dent. Ass., Lond., 1898, xix, 669.—**Burchard** (H. H.) Mr. Charles Tomes in re Gray's "Anatomy." Dental Cosmos, Phila., 1898, xl, 831. ——— Anæsthetics. Internat. Dent. J., Phila., 1898, xix, 629-639. ——— Some reflex disorders of dental origin. *Ibid:* 697-702.—**Carmona y Aparicio** (M.) La electrolisis en la avulsion de los dientes. Rev. dent. Mex., Mexico, 1898, i, 223-225.—**Carpenter** (G. T.) A method of handling alveolar pyorrhea. Dental Reg., Cincin., 1898, lii, 478-480.—**Cassidy** (J. S.) Materia medica and therapeutics. Dental Digest, Chicago, 1898, iv, 595-599.—**Chase** (W. G.) Alveolar abscess and caries of the maxilla. Items Interest, N. Y., 1898, xx, 825-829.—**Chilson** (W. H.) Alloy as a filling material. Dental Rev., Chicago, 1898, xii, 766-769.—**Christ** (J.) Eine schwere Kiefer- und Mundverletzung. Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 429-438.—**Codman** (J. T.) What instruments shall I carry. Internat. Dent. J., Phila., 1898, xix, 704-706.—**Cook** (G. W.) The effect of heat on dentine. Dental Reg., Cincin., 1898, lii, 481.—**Cosens** (C.) **and T. R. Smith.** Two cases of impaction of a vegetable foreign body, one in the submaxillary, the other in the sublingual salivary duct, leading to obstruction of the duct and formation of an abscess in the gland. St. Barth. Hosp. Rep., 1897, Lond., 1898, xxxiii, 105-108.—**Crawford** (C. W.) Taking impressions with modeling compound. Dental Digest, Chicago, 1898, iv, 674.—**Crouse** (J. N.)

Filling materials with special reference to amalgam. *Ibid:* 661–668.—**Dalma** (D.) Beitrag zur Therapie der akuten Erkrankungen des Periodontiums. Zahnärztl. Rundschau, Berl., 1898, vii, 4741.—**Darin.** Introduction de substances médicamenteuses dans l'économie à l'aide du courant galvanique. Rev. odont., Par., 1898, xvii, 349–353.—**Davies** (D. St. I.) General anesthetics. Indiana Dent. J., Indianap., 1898, i, 937–945. —**Davy** (T. G.) A case of removal of the left half of the tongue for epithelioma after preliminary ligation of the lingual artery. Australas. M. Gaz., Sydney, 1898, xvii, 146.—**Dean** (H. F.) Hydronaphthol. Dental Rev., Chicago, 1898, xii, 753–756.—**Delzell** (D. E.) Benefits of dental society meetings. Indiana Dent. J., Indianap., 1898, i, 1036–1038.—**Dolamore** (W. H.) Swelling of submaxillary glands due to the pressure of a lower denture. Dental Rec., Lond., 1898, xviii, 393–395.—**Donations** to the Army Medical Museum. Items Interest, N. Y., 1898, xx, 732–735.—**Driscoll** (W. E.) Preparing cavities. Dental Brief, Phila., 1897–8, iii, 125.—**Ewing** (F. C.) Recurring parotitis in a healthy child. Laryngoscope, St. Louis, 1898, v, 221–223. —**Falconery**. Tratamiento de la pulpa dental. Correo Internac. Odont., Madrid, 1897–8, iii, 1213–1216.—**Fenchel.** Sechs Jahre theoretischer und praktischer Arbeit in der Volks-zahnhygiene. Zahnärztl. Rundschau, Berl., 1898, vii, 4863; 4885.—**Fletcher** (T.) The shrinkage of amalgams. Brit. J. Dent. Sc., Lond., 1898, xli, 785.—**Flux** (G.) A method of administering nitrous oxide gas for the production of anæsthesia, avoiding the use of a closed mask or of valves. Lancet, Lond., 1898, ii, 993. —**Fournier.** Stomatite mercurielle. Rev. prat. d. trav. de méd., Par., 1898 lv, 313–315.—**Fowler** (A. A.) Paraform and its uses. Indiana Dent. J., Indianap., 1898, i, 963–965.—**Franchette.** Etude anatomo-pathologique du sinus maxillaire. Rev. odont., Par., 1898, xvii, 346–348.—**Frohmann** (D.) Zur Symptomatologie und Diagnose des acuten, nicht eitrigen Katarrhs der Kieferhöhle. Deutsche Zahnärztl. Wchnschr., Wiesb., 1898, i, 207–209.—**Gartrell** (J. H.) New die moulding flask and swager. Dental Rec., Lond., 1898, xviii, 441–443.—**Gibbons** (J. W.) The human tongue. Brit. J. Dent. Sc., Lond., 1898, xli, 869–879.—**Glogau-Davos** (E. A.) Ueber Zahnregulierung. Zahnärztl. Rundschau, Berl., 1898, vii, 4841.—**Goadby** (K. W.) Further notes of the bacteriology of the mouth. Brit. J. Dent. Sc., Lond., 1898, xli, 769–785.—**Goddar** (C. I.) Dentaduras de aluminio y de metales fusibles. Correo Internac. Odont., Madrid, 1897–8, iii, 1173–1177.—**Gourc** (L.) Radiographie d'un maxillaire supérieur pour la recherche des canines permanents chez un adulte. Presse méd., Par., 1898, ii, 189.—**Guilford** (S. H.) The importance of establishing a technic as well as literary standard for college entrance. Dental Cosmos, Phila., 1898, xl, 818–821.—**Head** (L. F.) La practica del dentista, en España. Rev. dent. Mex., Mexico, 1898, i, 48–50.—**Headridge** (D.) Dental education and medical qualifications. J. Brit. Dent. Ass., Lond., 1898, xix, 671–687.—**Helsham** (W. M.) A case of absence of soft palate and cleft tongue. Australas. M. Gaz., Sydney, 1898, xvii, 146.—**Hennessey** (J. C.) A case of hemorrhagic diathesis. Pacific Medico-Dent. Gaz., San Fran., 1898, vi, 457.—**Henshaw** (F. R.) Need of dental education in the public schools. Indiana Dent. J., Indianap., 1898, i, 1033–1036.—**Hickman** (H. B.) Dental abscess. Dental Brief, Phila., 1897–8, iii, 187.—**Holbrook** (A. T.) The logical relation of dentistry to medicine. Dental Rev. Chicago, 1898, xii, 729–737.—**Howatt** (A B.) The presence of arsenic in cements. Dental Rec., Lond., 1898, xviii, 405–407. —**Howell** (R. B.) Preparation of borders of cavities for filling. Dental Reg., Cincin., 1898, lii, 475–478.—**Hoyt** (H. W.) The examination of tonsils in adults. Homœop. Eye, Ear & Throat J., N. Y., 1898, v, 315–319.—**Huber** (G. C.) The innervation of the tooth-pulp. Dental Cosmos, Phila., 1898, xl, 797–811.—**Hutchinson** (J.) On teethache as distinct from toothache. Arch. Surg., Lond., 1898, ix, 257.—**Ivory** (W. A.) European dentistry. Dental Rev., Chicago, 1898, xii, 742–753.—**Jenkin's** (Dr.) Porzellan-Emaille. Zahntech. Rundschau, Berl., 1898, 4863.—**Jervey** (J. W.) Hypertrophy of the laryngeal tonsil, and the importance of its recognition by the general practitioner. N. York M. J., 1898, lxviii, 584–589.—**Johnson** (C. N.) A few considerations in filling teeth. Dental Cosmos, Phila., 1898, xl, 811–816. —**Johnston** (G. J.) Epithelioma of lip in a youth 18 years of age. Brit. M. J., Lond., 1898, ii, 1062.—**Jones** (P. H.) Uso del creosote y iodo en el tratamiento de abcesos alveolares. Rev. dent. Mex., Mexico, 1898, i, 112–114.—**Kahlo** (H. C.) Modern dental equipment. Indiana Dent. J., Indianap., 1898, i, 933–937.—**Kells** (C. E.) Roentgen rays in practice. Items Interest, N. Y., 1898, xx, 729–731.—**Kelso** (H. J.) A case of suppurating maxillary sinus. Dental Headlight, Nashville, 1898, xix, 174.—**Kirk** (E. C.) Abszesse an Zahnen mit lebenden Pulpen. Zahnärztl. Wchnbl., Hamb., 1898, xii, 502–504.—**Klein.** Welche Vorteile bietet uns die Bromäther-Narkose in der Praxis? Deutsche Zahnärztl. Wchnschr., Wiesb., 1898, i, 251.—**Kossobudzki** (S.) Lokalní anaesthesie dle Schleich. Casop lék. cesk., v. Praze, 1898, xxxvii, 165; 181.—**Kron** (H.) Fall von traumatischer peripherischer Hypoglossuslahmung. Berl. klin. Wchnschr., 1898, xxxv, 825.—**Kunert** (A.) Ein Beitrag zur Extraction unterer Molarenwurzeln. Deutsche Zahnärztl. Wchnschr.. Wiesb., 1898, i, 283–285.—**Laurens** (G.) Note sur un cas d'abcès chronique du voile du palais. Ann. d. mal. de l'oreille, du larynx [etc.], Par., 1898, xxiv, pt. 2, 197.

—**Le Gueut** (F.) Epithélioma du bord gauche de la langue. J. d. sc. méd. de Lille, 1898, ii, 390–393.—**Lemerle et Richard-Chauvin.** Absence congénitale presque complète de la dentition temporaire et de la dentition permanente. Odontologie, Par., 1898, 2. s., vii, 269–275. —**Lepkowski.** Vereinfachte Metallarbeit. Zahntech. Reform, Berl., 1898, xviii, 168–170.—**Lindsay** (B.) Military and Naval Dental Surgeons. Items Interest, N. Y., 1898, xx, 819–821.—**Long** (T. A.) Ancient Japanese dental art. Ohio Dent. J., Toledo, 1898, xviii, 457–459.—**McCardie** (W. J.) On a modification of Mr. Coxon's method of prolonging nitrous oxide anæsthesia during dental operations: namely, by means of a mouth tube and closure of the nares. Dental Rec., Lond., 1898, xxiii, 401–405. ——— On the prolongation of nitrous oxide anæsthesia in dental operations, by means of a mouth-tube. Treatment, Lond., 1898–9, ii, 417–421.—**McCardie** (W. J.) **and W. T. Madin.** On the prolongation of nitrous oxide anæsthesia for dental operations, by means of a mouth tube and closure of the nares. J. Brit. Dent. Ass., Lond., 1898, xix, 660–669.—**McElhinney** (M. G.) Medico-dental relations. Dominion Dent. J., Toronto, 1898, x, 316–318.—**M'Kellops** (H. L.) Arrest of development. Pacific Medico-Dent. Gaz., San Fran., 1898, vi, 456.—**McLaughlin** (R. G.) Sensitive dentine. Dominion Dent. J., Toronto, 1898, x, 346–349.—**Magea** (J. M.) Substance d'obturation parfaite pour les dents supérieures. Rev. odont., Par., 1898, xvii, 403–407.—**Mahé** (G.) Coiffage extemporané au cours d'une aurification. Odontologie, Par., 1898, 2. s., vii, 195–201. —**Malherbe** (A.) Le catarrhe pharyngé postérieur chronique et son traitement par le curettage. Rev. hebd. de laryngol. [etc.], Par., 1898, xviii, 1185–1191.—**Manning** (J. W.) Dental education. Items Interest, N. Y., 1898, xx, 833.—**Marlow** (G. C.) The physiological and pathological condition of the nerves relative to dentistry. Dental Rev., Chicago, 1898, xii, 764–766.—**Marshall** (J. S.) Leucoplakia. Dental Reg., Cincin., 1898, lii, 451–464.—**Martell.** Higiene de la boca. Correo Internac Odont., Madrid, 1897–8, iii, 1227; 1263.—**Martuscelli** (G.) Fibroma peduncolato (polipo fibroso) della lingua. Arch. ital. di laringol., Napoli, 1898, xviii, 145–154, 1 pl.—**Meadors** (J. T.) Syphilitic manifestations in the oral cavity. Dental Headlight, Nashville, 1898, xix, 153–159.—**Melvin** (H. A.) La honradez profesional. Rev. dent. Mex., Mexico, 1898, i, 43–47.—**Merrell** (H. H.) A plea for the more scientific and careful study of materia medica as a branch of dental education. Items Interest, N. Y., 1898, xx, 822–824.—**Miller** (W. D.) Caries of an unerupted tooth. Dental Cosmos, Phila., 1898, xl, 816. ——— *Also, transl.:* Deutsche Monatschr. f. Zahnh., Leipz., 1898, xvi, 425–428.—**Money** (A.) Geographical or mapped tongue. Australas. M. Gaz., Sydney, 1897, xvi, 119.—**Morgan** (H. W.) Report of a case of apparent disease of antrum of Highmore. Dental Headlight, Nashville, 1898, xix, 170–174.—**Morris** (W. W.) Concrescent teeth. Items Interest, N. Y., 1898, xx, 731.—**Mosher** (E. M.) Dentists' posture at operating chair. Indiana Dent. J., Indianap., 1898, i, 949–958.—**Mossop** (I.) Remarks on hare-lip. Brit. M. J., Lond., 1898, ii, 1147.—**Murray** (R. W.) Hare-lip and cleft palate. *Ibid:* 1146.—**Noble** (H. D.) Naso-pharyngeal obstructions. Pacific Medico-Dent. Gaz., San Fran., 1898, vi, 449–454.—**North** (G.) A correct bite in articulating teeth. Items Interest, N. Y., 1898, xx, 727.—**Ocurso** que la Sociedad Dental Mexicana eleva al C. Presidente de la Republica. Rev. dent. Mex., Mexico, 1898, i, 221.—**Ottolengui** (R.) The use and usefulness of crystalloid gold. Items Interest, N. Y., 1898, xx, 835–840.—**Page** (A. S.) Irregularities, with report of a case. Dental Headlight, Nashville, 1898, xix, 159–170.—**Palmer** (S. B.) Establishing a dental practice. Indiana Dent. J., Indianap., 1898, i, 945–948.—**Pastor Artigas** (F.) Algo sobre obturación de los dientes temporales. Rev. dent. Mex., Mexico, 1898, i, 229.—**Payne** (R. E.) Voice and enunciation; the singing voice and speaking voice as influenced by irregularity of the teeth. Dental Digest, Chicago, 1898, iv, 676–683.—**Pearsall** (W. B.) Tin foil matrices. Items Interest, N. Y., 1898, xx, 736.—**Peterson** (C. J.) Tomar molde de la boca en cera para arreglo de la correspondiente dentadura. Rev. dent. Mex., Mexico, 1898, i, 41–43.—**Petit** (G.) Considérations sur le psoriasis lingual (résultat de 10 observations). Indépend. méd., Par., 1898, iv, 298.—**Polscher** (A.) Metallene Gebissplatten. Zahntech. Rundschau, Berl., 1898, 4907. ——— Worauf beruht die Kohasionsfähigkeit des Goldes? *Ibid:* 4908.—**Port.** Ueber eine neue Kieferbruchschiene und Obturatoren der Highmorshöhle. München. med. Wchnschr., 1898, xlv, 1258.—**de Prideaux** (W. C.) Einige Bemerkungen über Matrizen. Zahnärztl. Wchnbl., Hamb., 1898, xii, 535.—**Prinz** (H.) Hemorrhage following extraction of teeth, its etiology and treatment. Dental Digest, Chicago, 1898, iv, 599–604.—**Prothero** (J. H.) Clay and plaster modeling applied to crown, bridge and porcelain work. Dental Rev., Chicago, 1898, xii, 737–742.—**Pulpabántalmak** (A.) Kórisméje. [The pathology of troubles of the pulp.] Magyar fogász szemle. A stomatol [etc.], Budapest, 1897–8, ii, 315–334. —**Randorf** (G.) Una oficina dental ideal. Rev. dent. Mex., Mexico, 1898, i, 51–53.—**Respinger** (H. B.) Ein Beitrag zum Kapitel der supernumerären Zahne. Zahnärztl. Rundschau, Berl., 1898, vii, 4781; 4801.—**Rice** (E. C.) Reply to the prosecution of a dental student. Dental Brief, Phila., 1898–9, iii, 129.—**Robertshaw** (H. A.) Some minor details in gold filling. Brit. J. Dent. Sc., Lond., 1898, xli, 913–918. ——— *Also:* Dental Rec., Lond., 1898, xviii, 457–461.—**Robertson**

(R. W.) Specialism in country practice. Dental Rev., Chicago, 1898, xii, 756–759.—**Rollin** (A.) Un cas de nécrose phosphorée localisée au maxillaire supérieur. Bull. Soc. anat. de Par., 1898, lxxiii, 540–543.—**Rose** (H.) Dental mechanics—appliances and devices for the correction of dental irregularities. Brit. J. Dent. Sc., Lond., 1898, xli, 817–819; 865–869.—**Samaniego** (M. N.) Cocaina. Rev. dent. Mex., Mexico, 1898, i, 173-176.—**Scheuer** (A.) Dolor post extractionen dentis. Zahnärztl. Rundschau, Berl., 1898, vii, 4821.—**Schmid** (H.) Pathologie de la dent de sagesse supérieure. Progrès dent., Par., 1898, xxv, 289–293.—**Schmidt** (E.) Zur Goldtechnik. Zahnärztl. Rundschau, Berl., 1898, vii, 4931.—**Schmidt** (H.) Pulpanalgen. *Ibid:* vii, 4783.—**Seitz.** Ein Fall von akutem Carbolismus und seine Heilung. Deutsche Zahnärztl. Wchnschr., Wiesb., 1898, i, 219–221.——— *Also:* Zahnärztl. Wchnbl., Hamb., 1898, xii, 536.—**Serrano** (F. R.) Extirpación parcial de la lengua. Rev. med. de Sevilla, 1898, xxxi, 150–153.—**Shaeffer-Stuckert.** Fotografia dental con los rayos Röntgen. Rev. dent. Mex., Mexico, 1898, i, 100–102.—**Shuey** (G. E.) La practica del dentista, en el Japon. *Ibid:* 53–56.—**Silva** (G.) L'ulcera tubercolare della lingua. Riv. veneta di sc. med., Venezia, 1898, xxix, 154–164.—**Smith** (A. H.) Healing processes in the dental pulp. J. Brit. Dent. Ass., Lond., 1898, xix, 654–660.—**Smith** (B. H.) Removal of the dental pulp. Dental Digest, Chicago, 1898, iv, 604–609.——— *Also:* Internat. Dent. J., Phila., 1898, xix, 702–704.—**Sparks** (R. E.) Temporary sets of artificial teeth. Dominion Dent. J., Toronto, 1898, x, 318–321.—**Spence** (S. J.) Administracion inter-alveolar de la eucaina. Rev. dent. Mex., Mexico, 1898, i, 111.—**Springle** (J. H.) Enfermedades del antro de Highmore. *Ibid:* 85–99.—**Stark.** Der Cement. Deutsche Zahnärztl. Wchnschr., Wiesb., 1898, i, 243–245.—**von Stubenrauch.** Phosphornekrose. München. med. Wchnschr., 1898, xlv, 1191.—**Suckstorff.** Mitteilung aus der Praxis. Deutsche Zahnärztl. Wchnschr., Wiesb., 1898, i, 271–273.—**Taft** (J.) Management of pulpless teeth. Dental Reg., Cincin., 1898, lii, 468–475.—**Talbot** (E. S.) Double resection of the lower maxilla. Internat. Dent. J., Phila., 1898, xix, 640.—**Tellier** (J.) Des lésions des dents et de la muqueuse gingivale dans les diverses diathèses. Odontologie, Par., 1898, 2. s., vii, 235; 276.—**Thompson** (A. H.) Comparative method of teaching dental anatomy. Dental Digest, Chicago, 1898, iv, 670–674.——— Los temperamentos y característica de los dientes en relación con la prótesis dental. Correo Internac. Odont., Madrid, 1897–8, iii, 1177–1182.—**Tietge.** Zur Aluminiumfrage. Zahnärztl. Wchnbl., Hamb., 1898, xii, 529.—**Vallas.** Ablation totale de la langue par le voie transhyoïdienne. Lyon méd., 1898, lxxxix, 81–83.—**Wagner** (H. L.) Leprous ulcer of the lip. N. York M. J., 1898, lxviii, 546, 1 pl.—**Walker** (Mrs. J. M.) Temperaments and teeth. Dental Brief, Phila., 1898–9, iii, 123–125.—**Walker** (W. E.) Anatomy: a critique. Dental Digest, Chicago, 1898, iv, 591–594. ——— Suggestion in nomenclature; cast and model. *Ibid:* 669.—**Walkhoff** (O.) Beitrag zur zahnärztlichen Unterrechtsfrage. Zahnärztl. Rundschau, Berl., 1898, vii, 4699–4702.—**Weld.** Los méritos del método químico-metálico para el tapamiento y la desinfeeción de los canales radiculares de los dientes semidesvitalizados. Rev. dent. amer., Phila., 1898, vi, 145–148.—**White** (G.) Treatment of pyorrhea. Dental Headlight, Nashville, 1898, xix, 149–152.—**Whittles** (D.) A preliminary review on progressive infective ulceration of the periodontium or alveolar dental membrane. Anat. Anz., Jena, 1898, xv, 108–110.—**Wilkinson** (J. E.) Filling: its success and failure. Dominion Dent. J., Toronto, 1898, x, 339–345.—**Wilson** (L. B.) Electro-deposit bridge. Items Interest, N. Y., 1898, xx, 735.—**Witzel** (J.) Ueber die Wirkung der arsenigen Säure und des Thymols. Deutsche Zahnärztl. Wchnschr., Wiesb., 1898, i, 260–261.—**Wohlgemuth** (H.) Ankylosis vera. Zahnärztl. Rundschau, Berl., 1898, vii, 4929.—**Würdeman** (H. V.) The operative treatment of pharyngeal adenoids. Laryngoscope, St. Louis, 1898, v, 207–211.—**X.** Terminología. Correo Internac. Odont., Madrid, 1897–8, iii, 1208–1212.—**Young** (C. A.) ¿Llegará á tener México una Escuela Dental? Rev. dent. Mex., Mexico, 1898, i, 153–158.

# LIST OF UNITED STATES PATENTS

## PERTAINING OR APPLICABLE TO DENTISTRY

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# INDEX TO VOLUME XL.

Abbott, F., use of hand burnishers, 429.
Abscess, development of in jaw-fracture, 192, 195, 203.
  direction of fistula from, 889.
  upon teeth with living pulps, E. C. Kirk on, 621, 969.
Abscessed teeth, painless opening of, 16.
Absorption and resorption, distinction between, 303.
Acid fixing and clearing bath for photographs, 149.
Acid theory of dental caries, 449.
Acids, action of on enamel, 91, 512.
  use of in pyorrhea, 762.
  use of in root-canal filling, 134.
Acrodont dentition, 106.
Adenoid growths, removal of, 310.
Advertisements in professional journals, 690.
Advertising dentists, evolution of, 770.
Age, determination of by the teeth, 260, 262.
Ainsworth, G. C., clinic by, 206.
  on treatment of carious approximal surfaces, 40, 45.
Albrecht, M., on posture at the operating chair, 853.
Albuminate of silver, action of on tooth-tissue, 296.
Alcohol as a disinfectant, 538.
Alexander, B., on legal right of dentists to prescribe, 573.
Alexander, C. L., clinic by, 218.
  on qualifications for membership in National Dental Association, 557.
Allen, H., obituary of, 76.
  on relative proportions of the jaws, 257.
Allen, H. J., "The Use of Formalin," 855.
Alloys, tests of, 934.
All-porcelain banded crown, R. W. Sweetser on, 1009.
Aluminum, affinity of for mercury, 591.
Aluminum crowns, A. E. Preston on, 550.
  information wanted, 164.
Alumni Association Boston Dental College, officers for 1898, 1046.
Alumni Society Philadelphia Dental College, annual meeting of, 473.
Alumnol, use of in pyorrhea, 546.
Alveolar abscess, L. Meisburger on surgical treatment of, 454.
  and pneumonia, 755.
Alveolar arch, ethnic characteristics of, 259.
Alveolar eminence, 106.
Alveolar pain, treatment of after extraction, 600.
Alveolar process, anatomy of, 996.
  resorption of, 895.
Alveolar pyorrhea, G. H. Thompson on, 304.
  discussion on, 305.
Alveoli, evolution of, 104.
Alveolo-dental abscess, surgical anatomy of, 1011.
Amalgam as a filling-material, 61, 676.
  cement lining for, 414.
  discussion on, 934.
  light wanted on, 549.
  systemic disturbances from, 207.
  use of gold in, 17.
Ambidexterity, advantage of to the dentist, 851, 853.
Ambler, H. L., clinic by, 381.
  on pulp-treatment, 295, 296.
Amended dental law of New York, 489.
American Academy of Dental Science, resolutions on death of Dr. Evans, 157.
American Dental Association, Transactions for 1897, notice of, 488.
American Dental Club of Paris, resolutions on death of Dr. Evans, 156.
American dental degrees, recognition of in Europe, 822.
American Dental Society of Europe, action of on death of Dr. De Trey, 875.
  action of on recognition of foreign certificates, 827.
  annual meeting of, 400.
  officers for 1898, 869.
American Dental Weekly, notice of, 231.
American dentists abroad, grievances of, 824.
American Medical Association, Section on Stomatology, annual meeting of, 657, 757, 859, 948, 1037.
Ames, W. V-B., "Cataphoresis (Electrolysis)," 615.
Ammonol, use of in pulpitis, 309.
Amoëdo, O., "L'Art Dentaire en Médecine Legale," review of, 974.
  on identification by means of the teeth, 114.
Amperage, definition of, 10.
Anatomy as an exact science, 881.
Anchorages, adjustment of in regulating appliances, 300, 999.
  formation of in filling-operations, 732, 815, 909.
  in bridge-work, 835.
Anchored adjustable dentures, 219.
Andrews, R. R., on ancient use of jadeite for inlaying, 364.
  on immediate extraction, 48.
  on physical characters of teeth, 446.
Anemic pyorrhea, 564.
Anesthetics in tooth-extraction, 161.
Angle, E. H., "Double Resection of the Lower Maxilla," 635.
Angle appliances, employment of for resection of maxilla, 554.
Angle system of regulating, 220.
  modification of, 243.
Angles, formation of in cavity walls, 733, 813.
Animal teeth, caries in, 140.
Annealing lamps, 181, 182, 313.
Anterior teeth, filling of, 724.
Antilithic, new, 245.
Antiseptic mouth-washes, 632.
Antiseptics in pulp-treatment, 134, 347, 383.
  in root-filling, 290, 294, 777.
  tests of, 1039.
Antral disease, treatment of, 791, 1040.
Antrum, abnormal forms of, 892.
  drainage of, 222.
  perforation of by abscesses on teeth, 889.
Aphthous sores mistaken for syphilis, 435.
Apparatus for porcelain inlaying, 361.
Approximal cavities, preparation of, 724, 811, 907, 987.
Approximal contact as a cause of dental caries, 725.
  avoidance of in anterior fillings, 127.
Approximal fillings, use of matrices in, 223.
Approximal surfaces, pressure of bacteria on, 516.
  treatment of, 39, 43.
Architecture of the human teeth, H. H. Burchard on, 605.
Aristotle's lantern, 97.
Army, employment of dentists in, 307, 644.
Arnold, O., on employment of dentists in army and navy, 644.
Arrington, B. F., on pyorrhea, 64.
Arrington, W. T., on Dr. Walker's "obscure case," 59.
  on pyorrhea, 145, 146.
Arsenious acid, use of in pulp-treatment, 133, 296, 297, 935, 937, 939.
Arthritis, analogy of with pericemental abscess, 970.
Articulating paper, substitute for, 78.
Articulation and occlusion, W. E. Walker on, 119.

Articulation and occlusion in bridge-work, 933.
  proper use of terms, 81.
Artificial teeth, occlusion of, 1024.
Asbestos in pulp-treatment, 134.
  in root-filling, 290, 292, 559, 876.
Ash, C. F., on root-canal filling, 134.
Asselot, M., process for uninflammable celluloid, 162.
Associations, value of, 37.
Assumptions in scientific work, 90.
Astigmatism, prevalence of, 27.
Atavism, hypothesis of in dental anomalies, 285.
Atkinson, W. H., on control of patients, 655.
  treatment of pyorrhea, 305.
Atlanta Dental College, commencement of, 395.
Auto-intoxication, 623.
Automatic mallet, effect of on gold fillings, 428.
Autosuggestion, 652.
Axial wall, formation of in filling-operations, 730, 991.

BACTERIA, relation of to enamel-decay, 92, 515, 529.
Bacterial infection, phenomena of, 622.
  of pericemental abscess, 969.
Baker, D. C., on crown-work, 369.
Baker, H. A., clinic by, 206.
  on treatment of carious approximal surfaces, 42.
Baldwin, A. E., "Some Facial Deformities and their Prevention," 948.
  on dental education, 661.
  on hydrogen dioxid, 1040.
  on leucoplakia, 860.
  on management of pulpless teeth, 957, 958.
  on pyorrhea, 761.
Balsam of Peru in leucoplakia, 841.
Balsamo del Deserto, clinic with, 559.
Baltimore College of Dental Surgery, commencement of, 369.
  notice of alumni meeting, 227.
Baltimore Medical College, Dental Department, commencement of, 587.
Band matrix, improvised, 40.
  use of, 225.
Band regulating appliances, 301, 919, 940.
Bandage, adjustment of for jaw-fracture, 194.
Bandless crown, advantages of, 948.
Bands for partial plates, 673.
Bar tin interdental splint, 200.
Barber, L. L., on coagulants in root-filling, 291.
Barker, A. E., on pyorrhea, 759.
Barker, C. C., on immediate extraction, 48.
Barker, W., on treatment of carious approximal surfaces, 39.
Barlow, F. C., on college instruction in prosthetic dentistry, 118.
Barnes, H., clinic by, 381.
  on coagulants in root-filling, 291.
  on membership record-book for dental societies, 124.
Barnes, W. A., on pyorrhea, 305.
Barrett, W. C., "Oral Pathology and Practice," review of, 786.
  on histology of cementum, 832, 833.
  on hypnotism in dentistry, 652.
  on immediate extraction, 51.
  on the term stomatology, 323.
  on toxic effect of cocain, 764.
  use of copper amalgam, 676.
Barrows, W. A., "Oral Hygiene and Mouth-Washes." 628.
  on formaldehyd, 344.
  on painless dentistry, 55.
  on pyorrhea, 305, 307.
Batteries, choice of for dental work, 12, 13, 128.
Bauschwitz, M., on formagen, 490.
Beach, J. W., on pyorrhea, 64, 65, 66, 144.
Beadles, E. P., peculiar case of chloroform-narcosis, 80.
  on examining boards, 1030.
  president's address by, 925.
Bean interdental splint, 193, 203.
Beauman, J. B., on preparation of cavities, 127.
Beck, C. S., "Is Dental Caries accompanied by Inflammatory Action?" 351.
  on bleaching with cataphoresis, 384, 385.
  on pyorrhea, 305, 307.
Beebee, J. H., on amalgams, 935, 936.
  on crown-work, 934.
  on treatment of irregularities, 940.
Belcher, W. W., on amalgams, 934.
  on inflammatory action in dental caries, 382.
  on painless dentistry, 55.
  reads Dr. Burkhart's paper, 775.
Belyea, F. S., "Treatment of Carious Approximal Surfaces in Bicuspids and Molars," 39.
Bentley, C. F., "The Care of Army Teeth," 307.
Bert, P., experiments with nitrous oxid, 497.
  on local action of cocain, 740.
Berzelius, electro-chemical series of, 618.
Bethel, L. P., clinic by, 381.
  experiments with silver nitrate, 287, 288.
  new dental journal, 975.
  on coagulants in root-filling, 289, 292.
Bicuspid, architectural design of, 607.
  restoration of by bridge-work, 835.
Bierring on formaldehyd as a disinfectant, 539.
Binocular vision, 33.
Birmingham Dental College, commencement of, 584.
Bishop, J. A., on treatment of jaw-fractures, 204.
Bismuth subnitrate in leucoplakia, 843, 844.
Bi-State dental meeting in Indiana, 686.
Bite, easy method of taking, 942.
Black, G. V., "Dr. Black's Conclusions Reviewed Again," 440.
  investigations of amalgam alloys, 934.
  on glandular structures of the pericementum, 626, 970.
  on immediate extraction, 47.
  on movement of teeth, 303.
  on sensitive dentin, 810.
  on welding property of gold foil, 182.
  scientific work of, 87, 508.
Black (G. V.) Dental Club, officers for 1898, 474.
Blackmarr, C. B., on hypnotism in dentistry, 650.
Blair, V. P., operation for resection of maxilla, 553.
Bland, C. A., on examining boards, 1030, 1032.
Bleaching teeth, E. C. Kirk on, 748.
  F. W. Low on, 383.
  discussion on, 384, 750.
Bliven, C. F., on treatment of carious approximal surfaces, 39.
Block, H., on caries in an unerupted tooth, 816.
Blood, contagiousness of in syphilis, 433.
Bockhardt's experiments with mercurials, 207.
Bödecker, C. F. W., on the odontoblasts, 801.
Bogue, E. A., on Dr. Black's scientific work, 86, 444.
  on prosthetic dentistry, 674.
Boice, A., obituary of, 234.
Boll's observations on nerve-endings of tooth-pulps, 798.
Bones, action of syphilitic virus on, 472.
Bonwill, W. G. A., on pyorrhea, 762.
  studies in articulation, 119, 831, 859.
  use of clasps, 674.
Bonwill articulator, 200.

Bony structures, anatomical changes in due to disease, 882.
Books and the dentist, M. N. Woodward on, 206.
Books received, 488.
Booth, J. W., on identification by means of the teeth, 114.
Born, W. T., on pulp-capping, 295.
Borothymol as an antiseptic, 776.
Boston Dental College, commencement of, 683, 786.
  meeting of Alumni Association, 1046.
Bowens, G. A., clinic by, 206.
Bowers, G. A., on treatment of carious approximal surfaces, 41.
  system of porcelain facings, 834.
Boyer on location of jaw-fracture, 237.
Brabson, B. D., on cataphoresis, 213.
  reads Dr. Frink's paper, 927.
Brady, W. J., regulating appliances at clinic, 220.
Brain, action of on bone-tissue, 906.
Branches, formation of in National Dental Association, 641.
Brenzcain as a local anesthetic, 600.
Bridge-work, H. N. Holmes on, 945.
  Howe's method of, 920.
  F. M. Rood on, 933.
  S. S. Stowell on, 834.
  abuse of, 671, 672.
Broca on wear of the teeth, 261.
Broomell, I. N., "Anatomy and Histology of the Mouth and Teeth," review of, 974, 1051.
  "The Histology of Cementum," 697, 834, 925.
Brophy, T. W., on Dr. Walker's "obscure case," 58.
Brown, G. C., on the dental law of New Jersey, 638.
  editorial comments on, 691.
Brown, G. V. I., "Hydrogen Dioxid in the Treatment of Diseases of the Mouth," 1038.
  address before Stomatological Section of American Medical Association, 657.
  on dental education, 662.
  on leucoplakia, 860, 861.
  on management of pulpless teeth, 957, 958.
Brush, E. W., investigations of nitrous-oxid anesthesia, 497.
Brush electrodes for cataphoresis, 314.
Bryant, E. A., claim of priority for removable bridge-work, 1059.
Buccal wall, management of in filling-operations, 990.
Buck, A. H., treatment of antral disease, 791.
Bulkley, L. D., "Manifestations of Syphilis in the Mouth," 431.
Bunodont type of molars, 253.
Burchard, H. H., "Dental Pathology, Therapeutics, and Pharmacology," review of, 594.
  "Surgical Anatomy of Alveolar Abscess Opening into the Anterior Nares," 1011.
  "Mr. Charles Tomes *in re* Gray's 'Anatomy,'" 831.
  "The Architecture of the Human Teeth," 605.
  "Varieties of Dental Calculi," 1.
  dental revision of Gray's "Anatomy," 790.
  method of tinning silver plates, 791.
  reply to by Dr. Walker, 119.
Burkhart, A. P., "Treatment of Pulpless and Ulcerated Teeth," 775.
Burkhart, H. J., on employment of dentists in the army, 308.
Burnishers, hand, for gold-filling, 169, 421.
Burs as dental obtundents, 14.
  choice of for preparation of cavities, 176, 732.
  discussion on, 927.
Business interests, elimination of from professional organizations, 867, 1049.
Butler, C. R., method of root-filling, 955.
  on coagulants in root-filling, 291.
  on preparation of cavities, 126.
Butler, C. S., "Dental Matrices," 223.
  on bleaching with cataphoresis, 385.
  on inflammatory action in dental caries, 382.
Buttress arrangement of incisors, 606.

Cachectic conditions due to rheumatic or gouty tendencies, 328.
Cady, H. W. F., on buccal syphilis, 467.
Caille, Dr., on the term stomatology, 322, 323.
Calcification, Tomes's theories of, 487.
Calculi, formation of, 1.
California State Board of Dental Examiners, annual meeting of, 589.
California State Dental Association, annual meeting of, 479.
Callahan, J. R., on smooth-point pluggers, 183.
Campbell, J. W., criticism of Dr. Lawshe's methods, 162, 331.
Camper's facial angle, 257, 737.
Canada balsam as a cavity lining, 679.
Canals, formation of in cement-substance, 530.
Canine, misuse of term, 607.
Canines, extreme development of, 102.
Canker sore, differentiation of from syphilis, 467, 471.
Cap crown, removable-facing, 921.
Capillary attraction, action of in root-filling, 288.
Capon, W. A., paper read by, 473.
Carbolic acid as a sterilizer, 930, 932.
  diffusibility of in root-canals, 288, 297.
  use of in pyorrhea, 762.
Carbutt's eikonogen and hydrochinon developer, 149.
Carcinoma, development of, 846.
Caries in an unerupted tooth, W. D. Miller on, 816.
  occurrence of in artificial denture, 747.
Carpenter, G. T., "A Method of Handling Alveolar Pyorrhea," 757.
Carpenter, W. H., on treatment of carious approximal surfaces, 43.
Carr, C. M., anchored adjustable dentures, 219.
Carr, I. N., "The Compatibility of Different Filling-Materials with Tooth-Structure," 60.
  on pyorrhea, 147.
Carr, W., on buccal syphilis, 465.
  on extraction of first permanent molars, 1024.
  on malformation of the dental arch, 310.
  on pyorrhea, 561.
  on use of oxyphosphate, 1026.
Case, C. S., orthopedic work of, 301, 1001, 1016.
Cassidy, J. S., on the spelling of scientific terms, 36, 247.
  on silver nitrate in root-filling, 296.
  on Weld's method of root-filling, 380.
Casts, preparation of for jaw-fractures, 201.
Cataphoresis, W. V-B. Ames on, 615.
  C. A. Hawley on, 128.
  F. W. Low on, 383.
  W. A. Price on, 373.
  causes of failure in, 12.
  caution in, 122, 163.
  control of by patient, 559.
  discussion on, 130, 384.
  electrodes for, 314, 499.
  in tooth-bleaching, 383, 750.
  new book on, 232.
  poisoning by use of, 600.
Cataphoric action of medicaments, 214.
  use of cocain, 739, 763, 957, 958.
Caustics, use of in leucoplakia, 843.
Cavities, lining of for amalgam fillings, 678, 679.

- Cavities, lining of for zinc-phosphate fillings, 333.
  - preparation of, 41, 43, 104, 126, 172, 177, 277, 356, 421, 724, 907.
  - preparation of for porcelain inlays, 634.
  - removal of decay from, 928.
  - sterilization of before filling, 857.
  - varnishing of, 294.
- Cavity formation, detail of, 812, 989.
- Celluloid matrices for cement fillings, 681.
  - uninflammable, 162.
- Cement fillings as dental obtundents, 385.
- Cement lining for amalgam fillings, 211, 414, 601.
  - for cavities, 65.
  - for gold fillings, 414.
- Cement spatulas, best material for, 678.
- Cement, typical position of, 104.
- Cemental tissue of old age, 713.
- Cements for porcelain inlays, 634.
- Cementum, I. N. Broomell on histology of, 697.
  - discussion on, 832.
- Central College of Dentistry, commencement of, 588.
- Central Dental Association of Northern New Jersey, officers for 1898, 387.
- Cervical wall, management of in filling-operations, 989.
- Chamberlain, F. C., on cocain, 957.
- Chambers, W. T., on pyorrhea, 759.
- Chancre, occurrence of in the mouth, 432, 437.
- Chappell, W. F., on buccal syphilis, 460.
- Chapple, J. A., "Dental Education from a College Standpoint," 337.
- Chase, H. S., obituary of, 233.
- Chase, W. G., "The Status of the Degree D.D.S. under the Law," 572.
  - on dental legislation, 780, 781.
  - paper read by, 473.
- Chemical nomenclature, 36, 247.
- Chemical problems in tooth-bleaching, 748.
- Chemical theory of dental caries, 93.
- Chemico-metallic method of root-filling, 134, 380.
- Chicago College of Dental Surgery, commencement of, 389.
- Chicago Dental Society, officers for 1898, 474.
- Chicago, dentistry in, 827.
- Children, pyorrhea in, 560, 563.
- Children's teeth, care of, 948.
- Chipley, J. N., on hydrogen dioxid, 1039.
  - on pyorrhea, 759.
  - on pyrozone as a local anesthetic, 959.
- Chisel, use of in excavating, 55.
  - management of in beveling enamel-margins, 992.
- Chloroform anesthesia by gaslight, 599.
- Chloroform, death from in tooth-extraction, 161, 407.
- Chloroform-narcosis, peculiar case of, 80.
- Choquet, Dr., on fermentation agents, 93.
- Christensen, W. E., "The Half-Cap Crown," 981.
- Cincinnati College of Dental Surgery, commencement of, 389.
- Cinnamon oil in anterior teeth, 416.
- Clancey, D. W., on Dr. Lowry's method of tooth-filling, 601.
- Clasps, fitting of to teeth, 669.
  - for partial dentures on rubber base, 667.
- Class legislation, 404, 569.
- Clayton, J. R., on posture at the operating chair, 854.
- Cleft palate, congenital causes of, 276.
- Clinics at New York Odontological Society, 459, 558, 744, 1012.
  - at Northeastern Dental Association, 206.
  - at Ohio State Dental Society, 381.
  - at Southern Dental Association, 218.
  - at Southern California Dental Association, 1046.
  - new departure in, 123.
- Coagulants in root-canals, discussion on, 289, 295.
- Coaptation of fractures, 190, 195.
- Cobalt in pulp-treatment, 959.
- Cocain and holocain, 599.
- Cocain, antidote for, 742, 923.
  - as a local anesthetic, 348, 923, 1056.
  - cataphoric use of, 739, 763.
  - hypodermic use of, 348.
  - in pulp-treatment, 953, 957, 958.
  - incompatibility of with cherry-laurel water, 600.
  - stable solution of, 350.
- Codman, J. T., "Items and Results from my Long Experience in Dentistry," 1022, 1024, 1026, 1028.
- Coffin plate as a regulating appliance, 917.
- Cohesive gold as a filling-material, 745.
  - use of in large cavities, 46.
- Cohnheim, theory of cancer, 862.
- College of Physicians and Surgeons of San Francisco, Dental Department, commencement of, 685.
- College examinations, superficiality of, 961.
- Colleges, right of to confer degrees, 482.
- Color changes in teeth, 749.
  - fixation of in tooth-bleaching, 754.
- Colorado State Dental Association, annual meeting of, 399, 657.
- Colton, G. Q., obituary of, 874.
- Columbian Dental College, commencement of, 396.
- Columbian University, Dental Department, commencement of, 588.
- Columbus Dental Society, officers for 1898, 474.
- Combination filling, 39, 680.
- Competition, influence of, 342.
- Condit's removable bridge-work, 672.
- Condyle path, 120.
- Cones, modification of tooth-forms from, 612.
- Congenital defects of enamel, 529.
- Congenital syphilis, case of, 471.
- Connecticut State Dental Association, officers for 1898, 783.
- Constitutional symptoms of syphilis, 467.
- Constricted vaults, G. S. Monson on, 914.
- Contagious phagedenic gingivitis, J. Falero on, 456.
- Continuous-gum, clinic with, 1012.
- Contour filling, advantages of over crown-work, 815.
  - with matrices, 357, 452.
- Cook, C. D., on immediate extraction, 48.
- Cook, S. B., on burs, 928.
  - on examining boards, 1031.
- Coon, W. W., "Gold in Amalgam," 17.
- Cope, E. D., on mammalian dentition, 108, 253.
- Copper amalgam, use of, 676.
- Corley, J. P., on pyorrhea, 66.
- Cornified teeth, 102.
- Coryl as a dental obtundent, 55.
- Cotton as a separator, 727.
- Cottrill, W. S., "Gomphiasis," 924.
- Countersunk teeth, disadvantages of, 163.
  - repair of, 331.
- Cowan, J. W., on pyorrhea, 306.
- Cowardin, L. M., on burs, 928.
  - on composition of filling-materials, 62.
  - on examining boards, 1032, 1034, 1035.
  - on pulp-treatment, 929, 930.
- Creasote, use of in pulp-treatment, 930, 932.
- Crib anchorage for regulating, 220, 937.
- Criminals, identification of by means of the teeth, 115.
- Criticism, amenities of, 87, 944.
  - sensitiveness to, 154.
- Cronkhite, J. A., clinic by, 1046.
- Cross-cut burs, advantages of, 928, 929.
- Crouse, J. N., dental obtundent, 932.
  - professional and trade interests of, 1049.
  - resolution offered by, 866.
  - work on amalgams, 935.

Crown- and bridge-work, W. E. Christensen on, 981.
  H. N. Holmes on, 945.
  H. W. Howe on, 920.
  F. M. Rood on, 933.
  R. W. Sweetser on, 1009.
  W. W. H. Thackston on misapplication of, 216.
  abuse of, 671, 672.
  methods in, 142, 164.
Crowns, porcelain facing of, 56.
Cryer, M. H., "Studies of the Maxillary Bones. No. 2," 881.
  acknowledgment to, 285.
  on immediate extraction, 50.
  on leucoplakia, 843.
  surgical treatment of irregularities, 1002.
Crystal gold, use of in amalgam, 18.
Crystalline gold foil, cohesive property of, 179.
Crystallization of amalgams, 680.
Current, control of in electrical appliances, 12, 378.
  for cataphoresis, 130, 767.
Curtis, G. L., "Comments on Dr. Foster's Paper on Cocain-Poisoning," 923.
Cushing, G. H., resolution of sympathy for, 866.
Cuspid, architectural design of, 607.
Cusps, treatment of in filling-operations, 912.
Custer, L. E., caution in cataphoresis, 163.
  demonstration of electric oven, 219.
  gold annealer, 218.
  president's address before Ohio State Dental Society, 121.
Cystic tumors, 58.

DAILEY, W. M., on gold foil, 1027.
Dall's system of porcelain inlaying, 361.
Daly, J. H., president's address by, 37.
Darby, E. T., case of alveolar abscess, 621.
  on porcelain inlays, 360, 363, 633.
  on tin as a filling-material, 358, 360.
Darby, F. B., announcement by, 309.
  on bleaching with cataphoresis, 384.
  on pyorrhea, 306.
Davenport, S. E., on immediate extraction, 48.
Davis, S., on hydrogen dioxid, 1040.
De Schweinitz, E. A., on formalin, 539.
Deane, W. C., on leucoplakia, 844, 845.
  on use of oxyphosphate, 1026.
Death following dental operations, 577.
  through swallowing a tooth, 600.
Deciduous teeth, A. E. Baldwin on care of, 948.
  W. H. Hall on treatment of, 862.
  discussion on, 951.
  use of formagen on, 492.
Degeneracy and dental deformities, E. S. Talbot on, 734.
Deglutition, obstructions to, 274.
Degrees, professional, from Medico-Chirurgical College, 481.
  recognition of in this and foreign countries, 822.
Delavan, D. B., on buccal syphilis, 459.
Dental anatomy, late discoveries in, 660.
Dental anomalies, 35, 81, 281.
Dental arch, D. L. Hubbard on malformation of, 270, 310, 311.
  correction of deformities of, 914.
  discussion on, 310.
Dental Association of the Province of Quebec, officers for 1898, 1047.
Dental bibliography, 82, 165, 249, 334, 417, 500, 602, 694, 793, 877, 978, 1061.
  difficulty of obtaining, 24.
Dental calculi, H. H. Burchard on, 1.
Dental caries, C. S. Beck on inflammatory action in, 351.
  beginning of on surface of tooth, 510.
  discussion on, 382.
  true cause of, 87.
Dental chairs, improved forms of, 850, 853.
Dental colleges, examinations in, 963.
  illegal degrees granted by, 830.
  importance of technic standard for entrance to, 818, 873.
  recognition of foreign certificates by, 825.
  relation of to dental education, 337, 1030.
Dental Commissioners of Connecticut, annual meeting of, 400.
Dental congress in Paris, 868, 872.
Dental convention in Baltimore, 399, 568, 778, 855, 960.
  in Buffalo, 53, 223, 304, 382.
  in New Orleans, 386.
  in Nova Scotia, 590.
  in Put-in Bay, 643, 846.
Dental Cosmos, editorial management of, 689.
  excess of matter for, 156, 693.
  publisher's notices, 79, 1060.
Dental degrees, 322, 325.
  legal status of, 572.
Dental education, J. A. Chapple on, 337.
  C. J. Essig on, 960.
  discussion on, 661, 967, 1030.
  high standard of, 54.
  in America, 823.
  object lesson in, 231.
Dental education of the public, J. A. Pearson on, 141.
  F. W. Proseus on, 769.
  discussion on, 772.
Dental engine, carelessness in use of, 732.
Dental examining boards, rights and powers of, 67, 639, 692, 960, 1030.
Dental hemorrhage, treatment of, 599.
Dental history, C. McManus on, 20, 247.
Dental hygiene, neglect of, 544.
Dental index, Flower's, 263.
Dental infirmaries, need for, 772.
Dental instruments as a source of contagion, 440.
Dental journalism, ethics of, 688.
Dental journals, new, 156, 975.
  request for files of, 370.
Dental law of Georgia, 158.
  of New Jersey, 403, 408, 638, 691.
  of New York, amendments to, 489.
Dental legislation, W. G. Chase on, 572.
  A. W. Sweeny on, 568.
  discussion on, 778.
  in Illinois, 828.
  in Ohio, 122.
  in Pennsylvania, 961.
  relation of to dental morality, 228.
Dental literature, high standard of, 339.
  importance of to the practitioner, 206.
  repetition of ideas in, 784.
Dental matrices, C. S. Butler on, 223.
  discussion on, 225.
Dental meetings, elements of success for 871.
Dental nitro-hydrochloric acid, 137.
Dental nomenclature, suggestions in, 81, 605, 924.
Dental office, care of, 941, 945.
  disinfection of, 857.
Dental patents, monthly list of, 84, 168, 248, 333, 420, 504, 601, 696, 796, 880, 977, 1064.
Dental pathology, new text-book on, 594.
Dental periodicals, historical papers in, 22.
Dental poultice, Dotterer's, 222.
Dental Practitioner and Advertiser, criticism of J. N. Crouse, 1050.
Dental Protective Association, action of in combating patents, 402.
  commendation of, 575.
Dental quackery, 570, 771.
Dental Review, criticism of J. N. Crouse, 1050.
Dental societies, advantages of, 121.
Dental Society of the State of New York, annual meeting of, 327, 662, 763, 832.
  officers for 1898, 474.

Dental students, increasing numbers of, 342.
  work of in tin fillings, 358.
Dental subjects in dental journals, 318.
Dental technics, teaching of, 964.
Dental surgery in the army and navy, congressional action on, 558, 593, 664.
Dental "wax," composition of, 78.
Dental writers, training of, 1007.
Dentin, calcification of, 624.
  formation of, 487.
  sensitiveness of, 809.
  sterilization of, 931.
Dentistry as a profession, 319, 779, 1005.
  enlargement of field of, 266, 735.
  live questions in, 547, 567.
  painless, 14, 295.
  patents in, 401, 866, 872.
  practice of by physicians, 323, 573.
  practice of in Great Britain, 162, 572.
  professional recognition of in England, 592.
Dentists, liability of to syphilitic infection, 433, 440, 469, 479.
  longevity of, 851.
  medical education of, 658.
  posture of at the operating chair, 846.
  practical points for, 940, 944.
  preliminary education of, 671, 818.
  right of to prescribe, 779.
  visual defects of, 27.
Dentition, retarded, 755.
Dento-alveolar abscess, etiology of, 622.
Denture, duplicate, construction of in absence of patient, 663.
Deposits, removal of in pyorrhea, 304, 306, 757.
De Trey, E. A., obituary of, 875.
De Trey, V., gold-filling at clinic, 220.
De Trey gold, condensing of, 423.
  good qualities of, 123.
Detroit College of Medicine, Department of Dental Surgery, commencement of, 580.
Developer for photographs, 149.
Diagnosis, caution in, 462, 464, 466.
Diagrams, use of in teaching, 136, 138.
Dictionaries, function of, 973.
Dies for crown-work, 368.
Diet, influence of on the teeth, 139, 262.
Differential diagnosis of syphilis, 469, 471.
Difficult dentition, powder for, 245.
Diphyodont dentition, 107.
Diplomas, indifference of the public to, 961.
  illegal sale of, 825, 827.
Dirty wax, removal of, 162.
Discussion on amalgams, 934.
  on batteries for cataphoresis, 130.
  on bleaching with cataphoresis, 384, 750.
  on buccal syphilis, 459, 470.
  on care of children's teeth, 951.
  on coagulants in root-filling, 289, 295.
  on dental education, 661, 967.
  on dental education of the public, 772.
  on dental legislation, 778.
  on dental matrices, 225.
  on Dr. Walker's "obscure case," 57.
  on electricity in dentistry, 214.
  on employment of dentists in the army, 308.
  on formalin, 858.
  on fractures of the maxillæ, 200.
  on hydrogen dioxid, 1039.
  on hypnotism in dentistry, 650.
  on inflammatory action in dental caries, 382.
  on leucoplakia, 843, 860.
  on malformation of the dental arch, 310.
  on management of pulpless teeth, 957.
  on methods of practice, 1024.
  on methods of teaching materia medica, 1044.
  on operative dentistry, 927.
  on painless dentistry, 54.
  on plastic fillings, 679.
  on porcelain inlay work, 360.
  on posture at the operating chair, 849.
Discussion on preparation of compound cavities, 126.
  on prosthetic dentistry, 369, 670.
  on pyorrhea alveolaris, 63, 144, 305, 560, 758.
  on reciprocal tooth-movement, 198.
  on regulation of teeth, 302, 940, 1014.
  on systemic effect of amalgam fillings, 211.
  on the term stomatology, 318.
  on tin as a filling-material, 358.
  on toxic effect of cocain, 763.
  on treatment of carious approximal surfaces, 43.
  on Weld's method of root-filling, 134.
Disinfectants, use of in root-filling, 289.
Disinfection of instruments, 383, 434, 440, 465, 470, 537.
Dodge, H. N., "Reciprocal Tooth-Movement: A Sequel," 196.
Dogiel's staining method, 805.
Donnally, W., on dental education, 967.
Dotterer, L. P., on pyorrhea, 147.
Dotterer, T., dental poultice, 222.
Double-decker splint, disadvantages of, 202.
Downs, E. D., cavity lining for zinc-phosphate fillings, 333, 678.
Dowsley, J. F., on immediate extraction, 50.
Dunn, H. E., on root-filling, 292, 296.
Dunning splint for jaw-fracture, 204.

Eames, G. F., clinic by, 206.
  on amalgam as a filling-material, 212.
Eastern Illinois Dental Society, officers for 1898, 386.
Eastern Ontario Dental Association, annual meeting of, 590.
Edentates, early forms of, 101.
Edge-breakage of amalgam fillings, 414.
Edington, I. C., "Some Thoughts for the Dentist," 940.
  on plastic fillings, 681.
Editorial work, problems in, 590.
Education, preliminary, of dental students, 661.
Egger, Dr., cases of velo-palatal insufficiency, 275.
Eggleston, J. W., on pyorrhea, 64.
Ehrichsen on location of jaw-fractures, 237.
Ehrlich staining method, 798.
Eighth District Dental Society of New York, annual dinner, 326.
Electric annealer, 183.
Electric current, decomposing action of, 741.
Electric oven, demonstration of, 219, 1013.
Electric root-drier, 317.
Electricity in dentistry, W. V-B. Ames on, 615.
  J. E. Keefe on, 498.
  C. S. Neiswanger on, 214.
  causes of failure, 9.
  discussion on, 214.
Electro-chemical series of Berzelius, 618.
Electrodes for cataphoresis, 314.
Electro-therapeutics, dental, 215.
Elliott, W. St. G., devices shown at clinic, 559.
  on buccal syphilis, 467.
  system of clasping teeth, 674.
Elliptical form of dental arch, 259.
Embryonic development of teeth, 865.
Enamel, J. Leon Williams on structural changes in, 505.
  cleavage of, 177, 909.
  development of in mammals, 486.
  injury to by constitutional diseases, 459.
  margins, beveling of, 992.
  organic matter in, 90.
  proper cutting of, 444, 731.
Endowments for dental colleges, 963.
England, dental legislation in, 571.
English recognition of American degrees, 822.
Environment, influence of on dental caries, 89.
Equilibrium, maintenance of in the human body, 848.

Erler, R., method of repairing Richmond crown, 415.
Erosion in ivory base-plate, 747.
Escharotics in pulp-treatment, 931, 953.
Eschelman, A. S., "Formalin," 344.
  president's address by, 54.
Essential oils, use of in root-canals, 287.
Essig, C. J., "The Relation of Examining Boards to Dental Education," 960.
Esthetics in dentistry, 163, 726.
Ether anesthesia, best method of, 245.
Ethereal solutions, use of in tooth-bleaching, 750.
Ethmoidal cells, anatomy of, 899.
Ethnic characteristics of the dental arch, 259.
Ethyl chlorid for painless pulp-removal, 132, 292.
Eucain in dental practice, 246, 1054.
  new preparation of, 310.
Evans, G., on porcelain inlays, 366.
  on tooth-movement, 1020.
Evans, T. W., obituary of, 71.
  resolutions on death of, 156.
Evolutionary development of man, 271.
Examining boards, relations of dental colleges to, 246, 960, 1032.
  restriction of powers of, 230, 404, 639, 692, 781.
Exercise for the dentist, 849.
Exostosis, case of, 459.
Experiments with formaldehyd, record of, 541.
Expression in crown- and bridge-work, H. N. Holmes on, 945.
Extension of cavities for prevention of caries, 725, 908.
Eyes, defects of in dentists, 27.

FACE, asymmetry of, 883, 948.
  evolution of, 736.
Facial angle, Camper's, 257, 737.
Facial clinometer. clinical demonstration of, 219.
Facial deformities, correction of, 301, 948.
Facial neuralgia from exposed pulp, 576.
Facial restoration, Dr. Land's case of, 1003.
Facings, broken, removal of, 143.
  removable, for crown- and bridge-work, 920.
  repair of in crown-work, 415.
  replacing of, 164.
Faculties *vs.* examiners, A. E. Guptill on, 285.
  R. Ottolengui on, 116.
Failures, lessons from, 723.
Falero, J., "Contagious Phagedenic Gingivitis," 456.
Farrar, J. N., on movement of teeth, 303.
Faught, L. A., on root-canal filling, 136.
Fear, effect of on patients, 350.
Fees in dentistry, 941, 1015.
Fencing as an exercise for the dentist, 851.
Ferris, H. C., on pyorrhea, 566.
Ferrule system of crown-work, 367.
Fillebrown, T., on histology of cementum, 832.
  on immediate extraction, 51.
  on packing gold, 428.
  president's address at National Dental Association, 866.
Filling-materials, I. N. Carr on compatibility of with tooth-structure, 60.
  choice of, 413.
Filling-operations, C. N. Johnson on, 723, 811, 907, 987.
Fillings, finishing of, 127, 186.
  painless removal of, 14.
  retention of, 355.
  superiority of to crown-work, 44.
  *vs.* crowning, 815.
Finley, M. F., on dental legislation, 780.
First District Dental Society, monthly meetings of, 134, 309, 366, 470, 755, 1021.
  officers for 1898, 756.
First permanent molar, extraction of, 1022.
Fishes, ending of pulp-nerves in, 803.
  teeth of, 106.
Fissures, formation of in teeth, 613.
  treatment of in filling-operations, 911.
Flagg, J. F., "What is It?" 547, 934.
  cavity lining, 930.
  obituary of Dr. Chase, 233.
  on filling-materials, 61.
  on immediate extraction, 49.
  work on amalgams, 934.
Flanagan, A. J., on amalgam as a filling-material, 211.
Fletcher, Alice C., on the teeth of aborigines, 139.
Fletcher, F. F., hygienic saddle for bridge-work, 220.
Floris, H., on ichthyol in dentistry, 599.
Flower's classification of the human race, 264.
  gnathic index, 257, 263.
Fluids, accumulation of in maxillary sinus, 905.
Fogg, J. M., method of replacing broken Richmond crown, 164.
Food, physical relation of to the teeth, 139.
Force, application of in regulating appliances, 297, 303, 917, 1000, 1015.
  distribution of in teeth, 125.
Foreign certificates, abuse of in college matriculation, 826.
Formagen, clinical experience with, 494.
  practical and theoretical trials of, 490.
Formaldehyd, E. G. Horton on, 537.
  as an antiseptic, 344, 383, 490, 856.
  bibliography of, 542.
Formalin, H. J. Allen on, 855.
  A. S. Eschelman on, 344.
  coagulating properties of, 345, 490, 539.
  discussion on, 858.
Formative function of enamel, 507.
Fosheim, F. L., on gold foils, 1028.
  on use of oxyphosphate, 1027.
Foster, Dr., on the term stomatology, 319.
Foster, M., on the field of vision, 29.
Foster, M. W., "The Toxic Effect of Cocain, induced through Cataphoresis, applied to a Pulp preparatory to its Removal," 739.
  comments on by Dr. Curtis, 923.
Foster, S. W., on preparation of cavities, 929.
Fox, theory of dental caries, 353.
Fracture, mechanical provision against in tooth-structure, 609.
Fractured teeth, treatment of, 199.
Fractures of the maxillæ, P. W. Moriarty on, 235.
  F. D. Weisse on, 188.
  discussion on, 200.
Francis, C. E., on immediate extraction, 46.
Freeman, R. R., method of constructing duplicate denture in absence of patient, 665.
  on clasps for partial dentures, 668.
Freeman, S., on action of arsenic on tooth-pulp, 756.
  on leucoplakia, 844.
Freidrichs, G. I., on pyorrhea, 64, 144.
French, F., on plastic fillings, 679.
  on society discussions, 944.
French, T. R., on buccal syphilis, 468.
Frink, L. F., "Failures in Operative Dentistry," 927.
Frog face, causes of, 274.
Frontal sinus, relation of to the antrum, 897.
Frye, J. C., on use of hydronaphthol in decayed teeth, 792.
Function, specialization of in mammalian dentition, 112.
Furred tongue, significance of, 629.
Fusible alloy for die and counter-die, 371.
Fusible metal, formula for, 498.
Fynn, A. H., on hydrogen dioxid, 1040.

GAGE, A. R., obituary of, 599.
Galvanic current, action of on fillings, 214.
  passage of through liquids, 615, 619.
  use of in tooth-bleaching, 750.
Gane, Mr., on tooth-bleaching, 754, 755.
Gardner, H. B., on nitrous-oxid anesthesia, 497.
Garretson, J. E., heroic treatment of pyorrhea, 305.
  on location of jaw-fractures, 238.
  on self-correction of irregularities, 274.
Garrison, C. G., legal definition of dentistry, 574.
Gaylord, E. S., clinic by, 459.
  on buccal syphilis, 466.
Genese, D., on dental legislation, 779.
Georgia, dental law of, 158.
German silver resistances in cataphoric work, 499.
Germicides, employment of for prevention of dental caries, 537.
Gerrish, C. H., clinic by, 206.
Gibson, K. C., charts of syphilitic palates, 472.
  interdental splint, 192.
  on location of jaw-fractures, 238.
Gilbert, G. W., case of replantation, 81.
Gilbert, V. W., "A Dental Anomaly," 35.
Gillett, H. W., early work in cataphoresis, 615.
Gingivitis, association of calculi with, 5.
  contagious, J. Falero on, 456.
Gires, P., "Hypodermic Local Anesthesia as Practiced in Europe," 347.
Glass inlays, failure of, 361, 366.
Glossitis, confusion of with syphilis, 435.
Gnathodynamometer, use of in recording stress of mastication, 909.
Goble, L. S., "Painless Dentistry," 14.
  on bleaching with cataphoresis, 385.
  on plastic fillings, 682.
  on pyorrhea, 306.
Goddard, C. L., on dental nomenclature, 303.
Gold, annealing of, 181, 222, 313.
  as a cavity lining, 333, 678.
  as a filling-material, 61, 550, 1023.
  cohesive property of, 281.
  Steurer's, improvement in, 312.
  use of in amalgam, 17.
Gold and tin fillings, 745.
Gold crowns on oral teeth, 672, 946.
Gold crown-work, Usher's system of, 367, 369.
Gold cylinders, best forms of, 180.
Gold facing of metals without aid of battery, 222.
Gold fillings, Libby's method of inserting, 169, 221, 421.
  clinical demonstration of, 220, 221.
  condensing test with different instruments, 425.
  exposure of in anterior teeth, 726.
Gold foils, choice of for hand fillings, 180.
  method of folding, 877.
Gold tipping for frail teeth, 674.
Gold work, decadence of, 671.
Goldsmith, S. L., on buccal syphilis, 471, 473.
  on crown-work, 370.
  on prosthetic dentistry, 674.
  on toxic effect of cocain, 768.
  revitalization of pulp after application of arsenic, 756.
Golgi staining method, 798.
Gomphiasis, W. S. Cottrill on, 924.
Goodyear, C., historical paper on, 56.
Gordon, G. B., on ancient use of jadeite for inlaying, 364.
Gordon, Judge, opinion confirming charter rights of Medico-Chirurgical College, 481.
Gould's Pocket Pronouncing Medical Dictionary, review of, 1054.
Gout, typical expressions of, 329.
Gouty calculi, 8.
Gouty theory of pyorrhea, 145, 544, 627, 761, 972.
Grady, R., on dental education, 967.
Granular layer of cementum, 700.
Granulation-tissue, sloughing of in syphilis, 438.
Gray's "Anatomy," dental revision of, 831.
  review of, 789.
Greene, F. A., on prosthetic dentistry, 672.
Greene's seamless crown, 933.
Grooves for anchorage, 910.
Guaiacol, succedaneum for, 600.
Gudex, V. A., tests of antiseptics, 1039.
Guilford, S. H., "Orthodontia," review of, 788.
  "The Importance of Establishing a Technic as well as Literary Standard for College Entrance," 818.
  "Physiology and Dynamics of Tooth-Movement," 995.
  on deformities of the dental arch, 915.
  on immediate extraction, 51.
Gummata, syphilitic, 438, 472.
Gums, diseases of, 456, 545.
  relation of to the teeth, 630.
Gum-tissue, reunion of in pyorrhea, 64.
Gunning, Dr., treatment of jaw-fractures, 205.
Guptill, A. E., reply to by Dr. Ottolengui, 116, 285.
Gutta-percha as a filling-material, 679.
  as a pulp-capping, 928.
  as a separator, 727, 988.
  as a temporary stopping, 988.

HALL, W. H., "Only a Baby Tooth," 862.
  on care of children's teeth, 952.
Halsey, W. E., on amalgam fillings, 210.
Hand burnishers for gold-filling, 169, 276, 421.
Handles, best form of for pluggers, 171, 175, 429.
Harbison, H. R., clinic by, 1046.
  paper read by, 1046.
Harlan, A. W., "Pyorrhea Alveolaris, with Some Notes from the Practice of the Author," 543.
  clinic by, 558.
  experiments with coagulants, 287.
  new scalers, 560.
  resolution offered by, 868.
Harris, C. A., on dental history, 22.
Harris and Lebanon Valley Dental Associations, joint meeting of, 327.
Harris's "Dictionary of Dental Science," review of, 973.
Hart, J. I., on porcelain inlays, 363.
  on pyorrhea, 561.
  on relations of alveolar abscess and pneumonia, 755.
  on root-canal filling, 136.
  on treatment of irregularities, 1019.
  on vulcanization of silver, 369.
  specimens of abnormal teeth, 459.
Hartman, S. B., address by, 644.
Hartung, G. J., on hydrogen dioxid, 1039.
Hartzell, T. B., on hypnotism, 654.
Harvard Dental Alumni Association, officers for 1898, 782.
Harvard Odontological Society, officers for 1898, 227.
Harvard University, Dental School, commencement of, 684.
Harvey, H. S., on dental legislation, 781.
Harwood, G. F., "Methods in Crown- and Bridge-Work," 142.
Hatch, H. D., case of retarded dentition, 755.
  repair of countersunk teeth, 331.
Haversian canals, presence of in cementum, 833.

Hawley, C. A., "Secondary or Storage Batteries for Cataphoresis," 128.
Hayden, H. B., on leucoplakia, 861.
Hayden, T. B., clinic by, 206.
  experiments with gold fillings, 424.
Head, variations in anatomy of, 881.
Heart-disease, nitrous oxid not contraindicated in, 19.
Heat as a disinfectant, 473.
Heater, new, 559.
Hechler, J. W., on employment of dentists in the army, 308.
  on pyorrhea, 306.
Heitzmann, C., histological theories of, 290.
Hemoglobin, chemical changes in causing tooth-discoloration, 749.
Henriquez, J. M., case of irregularity, 1021.
Herbst, W., method of burnishing, 429.
Herdman, W. J., on cataphoresis, 616.
Hereditary causes of irregularities, 272.
Hereditary syphilis, buccal manifestations of, 439.
Hersh, W. H., clinic by, 381.
Hert, B. S., on amalgams, 936.
  on plastic fillings, 681.
  on treatment of pulpless teeth, 778.
Hewer, H. B., on pyorrhea, 307.
Hickman, H. B., on use of cinnamon oil in anterior teeth, 416.
Hill, O. E., on porcelain inlays, 364.
  on pyorrhea, 560.
  on the term stomatology, 320, 322, 325.
  on tooth-bleaching, 753, 754.
Hill, W. B., "Method of teaching Materia Medica, with Special Reference to Dental Students," 1042.
  discussion on, 1044.
Hillyer, E., method of constructing duplicate denture in absence of patient, 663.
Hinman, T. P., "Photo-Micrography," 149.
  clinic report by, 218.
Hippocrates, theory of dental caries, 353.
Historical works on dentistry, 21.
Hitchcock, T. B., micrometer tests of alloys, 935.
Hodson, J. F. P., "Contour Slip Matrices," 452.
  clinic reports by, 459, 558, 744, 1012.
  on buccal syphilis, 466, 471, 473.
  on tin as a filling-material, 360.
  on tooth-movement, 1020.
  presentation of dental publications to New York Odontological Society, 371.
Hofheinz, R. H., on dental education of the public, 774.
  on employment of dentists in the army, 308.
  on leucoplakia, 845.
  on prosthetic dentistry, 670, 673.
  on regulating teeth, 940.
Holland, F., filling-operation at clinic, 220.
  on pulp-treatment, 930, 931, 932.
Holmes, H. N., "Expression in Crown- and Bridge-Work," 945.
Holococain as a local anesthetic, 350.
  comparative value of with cocain, 599.
Homeopathic physicians, objections to amalgam fillings by, 212, 213.
Hopson, M. F., mummifying paste, 499.
Horton, E. G., "Formaldehyd as a Practical Disinfectant for Instruments," 537.
Hot water as a disinfectant, 538.
  use of in periodontitis, 52.
  use of in pyorrhea, 760.
How, W. S., "Teeth Investments," 975.
  method of porcelain inlaying, 361.
  suggestion in dental nomenclature, 81.
Howard, C. T., on case of death following dental operations, 579.
Howard, F. E., antiseptic solution, 777.
Howard University, Dental Department, commencement of, 589.
Howe, H. W., "Removable-Facing Crown- and Bridge-Work," 920.
  comments on by Dr. Bryant, 1059.
Howe, J. M., use of formalin in pulp-treatment, 346.
Hubbard, D. L., "Immediate and Remote Causes of the Malformation of the Dental Arch," 270.
Huber, G. C., "The Innervation of the Tooth-Pulp," 797.
Hugenschmidt, A. C., cases of alveolar abscess, 290.
Human body, mechanics of, 847.
Human side of the dental practitioner, 153.
Humor in dental journalism, 156.
Hunt, G. E., on hypnotism, 653.
Hunt, R. F., work on dental history, 25.
Hunter, Dr., on root-filling, 295.
Hutchinson teeth, 439.
Hydrastis, use of in leucoplakia, 844.
Hydrogen dioxid as a bleaching agent, 752.
  in treatment of mouth-diseases, 1038.
  use of in alveolar abscess, 455.
Hydrogen peroxid, use of in pyorrhea, 562.
Hydronaphthol in leucoplakia, 846.
  mouth-wash, 546.
  use of in pulp-capping, 678, 792, 930.
Hygienic saddle for bridge-work, 220.
Hyperbolic form of dental arch, 259.
Hypercalcic cementosis, 64.
Hypnosis in dentistry, 56, 645.
Hypodermic local anesthesia in Europe, P. Gires on, 347.

ICHTHYOL in dentistry, 599.
Ichthyosis linguæ, 837.
Ideal sterilizer, 857.
Ideas, transferrence of by thought-waves, 648.
Illinois, dental legislation in, 828.
Illinois Board of Dental Examiners, annual meeting of, 227.
Illinois State Dental Society, annual meeting of, 327.
Immediate root-filling, 137.
Implantation clinic, 219.
Impression-cups, danger of contagion from, 467.
Impression-taking, hints on, 942.
  in cases of irregularity, 918.
  in jaw-fractures, 194, 202.
Improved appliances, influence of on health of the dentist, 852.
Incisal angle, formation of in filling-operations, 730.
Incisors, architectural design of, 606.
  excessive protrusion of, 1021.
  extreme development of in the beaver, 109.
  restoration of, 279.
Incremental lines of cementum, 706.
Incubation period of syphilis, 436.
Indiana Dental College, commencement of, 583.
Indiana Dental Journal, establishment of, 156.
Indians, teeth of, 140.
Infection, dangers of to the patient and dentist, 433.
Inflammation, predisposing causes of, 352, 382.
Inflammatory action in dental caries, 351, 382.
Inglis, O. E., case of valvular obstruction to discharge of pus from abscessed tooth, 332.
Inlays, porcelain, Dr. Jenkins's method of, 361, 633.
Innervation of the tooth-pulp, G. C. Huber on, 797.
Insects, feeding-organs of, 98.
Instruments, Libby's, for gold fillings, 169, 221, 421.
  disinfection of, 383, 434, 440, 465, 470, 537.
  for tin fillings, 359.
  making patterns for, 429.
  painless use of, 14.
Interdental articulation and occlusion, 119.

Interdental spaces, preservation of, 124.
Interdental splints for jaw-fracture, 192, 200, 241, 637.
Interglobular spaces of cementum, 700.
International dental congress in Paris, 868, 872.
Interstate recognition of licenses, 406, 781.
Iodoform, substitute for, 310, 318.
  use of in anterior teeth, 416.
Iowa State Dental Society, annual meeting of, 328.
Irregularities, W. S. Locke on treatment of, 297.
  caused by premature extraction, 864.
  correction of, 915, 936, 1014.
Isaac Knapp Dental Coterie, officers for 1898, 1048.
Ivory, pathological changes in, 747.

JACK, L., on matrices, 223.
  on the Bonwill mallet, 428.
  use of formalin in pulp-treatment, 346, 383.
Jackson, H. N., on oil of cloves as a dental obtundent, 332.
Jackson, V. H., crib anchorage for regulating, 220, 937.
  on leucoplakia, 844.
  on pyorrhea, 565.
  on treatment of irregularities, 1018.
  regulating clinic, 1013.
Jacobi, G. P. G., work on dental history, 23.
Jadeite, ancient use of for inlaying, 364.
James, F. L., on systemic symptoms of gout, 329.
Jameson, A., "Suggestion as a Factor in Controlling Patients during Dental Operations," 644.
Jarvie, W., on dental caries, 748.
  on porcelain inlays, 364.
  on pyorrhea, 560.
  on reciprocating tooth-movement, 199.
  on tin as a filling-material, 359, 366.
  on tooth-bleaching, 751.
  on toxic effect of cocain, 763.
  on treatment of jaw-fractures, 204.
  on treatment of root-canals, 317.
Jaw, development of, 272, 949.
  fracture of, 188, 235.
  resection of for protrusion, 552, 635.
  strain, 660.
  upper, degree of protrusion of, 257.
Jenkins, N. S., method of porcelain inlaying, 361, 633.
Jewelers' broaches as dental instruments, 14.
Jewett, H. R., on examining boards, 1031, 1035.
Johnson, C. L., clinic by, 206.
  on treatment of carious approximal surfaces, 39.
Johnson, C. N., "A Few Considerations in Filling Teeth," 723, 811, 907, 987.
  on treatment of carious approximal surfaces, 42.
Johnson, H. H., dental anomaly, 284.
  on cross-cut burs, 929.
  on examining boards, 1034, 1035.
Johnson, W. L., obituary of, 598.
Jones, J. N., on examining boards, 1031.
  on pulp-treatment, 930, 932.
  welcoming address, 925.
Jones, R. H., on pyorrhea, 147.
Jones, W. I., on coagulants in root-filling, 290.
Jones, W. T., clinic by, 381.

KANSAS CITY Dental College, commencement of, 389.
Kansas State Dental Association, annual meeting of, 327.
Keefe, J. E., on electricity in dentistry, 498.
Kells, C. E., on amalgam, 210.
  on electricity in dentistry, 214.
Keltig, E. M., on influence of diet on the teeth, 141.
Kemp, Dr., investigations on nitrous-oxid anesthesia, 497.
King, A. B., on dental education, 967.
King, J. S., method of pulp-capping, 932.
Kingsley interdental splint, 192.
Kingsley, N. W., on etiology of irregularities, 735.
Kirk, E. C., "A Dental Anomaly," 281.
  "A Restatement of the Tooth-Bleaching Problem," 748.
  "Abscess upon Teeth with Living Pulps," 621.
  acknowledgment to, 537 *note.*
  address before Eighth District Society, 326.
  correction by, 265.
  introduction of lithia for treatment of pyorrhea, 305.
  on annealing gold foil, 182.
  on care of the tongue, 631.
  on preliminary education of students, 671.
  pathological changes in artificial denture, 746.
  use of asbestos in dentistry, 875.
Kissing, dangers of infection from, 457, 466.
Knapp, J. R., on pyorrhea, 147.
Kristaline as a cavity lining, 754.
Kunert, A., clinical experience with formagen, 494.

LABIAL wall, treatment of in filling-operations, 730, 812.
Labor organizations, utilization of in dental education of the public, 722, 724.
Lactate of silver in pyorrhea, 760.
Lactic acid treatment in pyorrhea, 63.
Lamellæ of cementum, 703.
Lancet, use of in inflammation, 49, 51.
Land, C. H., "Combination of an Entire Set of Artificial Teeth, Lip, and Beard," 1003.
Langmaid, S. W., "A Consideration of the Objections offered by Physicians to Amalgam Fillings," 207.
Lapowski, B., on buccal syphilis, 465.
Law and morality, 228.
Law schools, preliminary requirements for, 339.
Law *vs.* anarchy in dental education, 67.
Lawshe, A. R., criticism of methods of, 162.
Lead, first use of for storage batteries, 128.
Lee, F. H., on plastic fillings, 682.
Legislative safeguards for dentistry, 70.
Leistikow, paste for leucoplakia, 841.
Lennmalm, H., work on dental history, 23.
Leptothrix, relation of to dental caries, 448.
LeRoy, L. C., on buccal syphilis, 470.
  on histology of cementum, 833.
  on leucoplakia, 844.
  on malformation of the dental arch, 311.
  on pyorrhea, 565.
  on root-canal filling, 136.
Leucoplakia, J. S. Marshall on, 836.
  discussion on, 843, 860.
Leverage in tooth-movement, 1019.
Libbey, J. A., on immediate extraction, 53.
Libby, H. F., "A Method of Inserting Gold Fillings with the Use of Hand Burnishers, as Practiced Exclusively for Twenty Years," 169, 276, 421.
Licenses, interstate recognition of, 967.
Life, phenomena of, 351.
Ligature, substitute for in retaining rubber-dam, 78.
Light, velocity of, 34.
Lime, use of in root-filling, 294.
Lime-salts, assimilation of by bony tissue, 906.
  proportion of in good and bad teeth, 442, 508, 548.
Linen tape as a separator, 727.
Lingual wall, management of in filling-operations, 990.
Litch, W. F., method of constructing partial denture in absence of patient, 663.

Litch, W. F., on immediate extraction, 49.
  on clasps for partial dentures, 667, 669.
Literary requirements for dental students, 341.
  style in scientific papers, 590, 1006.
Lithia in treatment of pyorrhea, 145, 305, 329.
Littig, J. B., on buccal syphilis, 472.
  on dental education, 967.
  on porcelain inlays, 363.
  on reciprocating tooth-movement, 198.
  on tooth-bleaching, 753.
  on treatment of irregularities, 1016.
  on vulcanization of silver, 369.
Local anesthetics, accidents from, 347, 764.
Locke, W. S., "Physical Changes that take place in Tissue under Pressure," 297.
  clinic by, 381.
Locomotion, genesis of, 96.
Lodge, E. B., clinic by, 381.
Loeffler, C. T., address by, 644.
Logan crown, advantages of, 946.
  fitting of over platinum cap, 744.
Lombroso's theory of degeneracy, 735.
Lophodont type of molars, 253.
Lord, B., on immediate extraction, 47.
Louisiana State Dental Society, annual meeting of, 67.
  officers for 1898, 386.
Low, F. W., "Bleaching with Cataphoresis," 383.
  on toxic effect of cocain, 765, 766.
Low fusible metal, formula for, 498.
Lowry, H. S., novel method of filling teeth, 413, 601, 743.
  on immediate extraction, 49.
  system of crown- and bridge-work, 222.
Luschka's tonsil, 273.
Lycetol as an antilithic, 245.
Lymphatic glands of the pericementum, 626, 969.
Lymphoid enlargements, deformities caused by, 311.
  hereditary tendency to, 273.

McIntosh electrodes for cataphoresis, 216.
McKellops, H. J., method of root-filling, 955.
McLaren, F. J., on buccal syphilis, 471.
McLean, W. T., "A Method of Treatment to Promote the Utility of Pulpless Teeth," 131.
  on coagulants in root-filling, 292.
McLeod, E. V., obituary of, 77.
McManus, C., "One of the Present Needs of the Profession—A History," 20, 247.
McManus, J., on the term stomatology, 319.
McMillen, D. J., gold-filling at clinic, 221.
McNeille, C. S., obituary of Dr. Cotton, 874.
Magee, J. M., method of filling, 415.
Maine Board of Dental Examiners, annual meeting of, 479.
Maine Dental Society, annual meeting of, 590.
Malformations of the dental arch, 270.
Mallet, use of in gold fillings, 428, 1023.
Malocclusion, correction of in pyorrhea, 631.
  extreme type of, 636.
Mammalia, ending of pulp-nerves in, 803.
Mammalian dentition, 105, 109, 253.
Man, degeneration of teeth in, 255.
  perfect physical type of, 271.
  position of in zoology, 103.
Marble-dust, use of in taking impressions, 672, 673.
Marco, B. B., "A System to Assist in the Identification of Criminals by Means of the Teeth," 113, 310.
Margins, beveling of in filling-operations, 814, 929.
Marion-Sims College of Medicine, Dental Department, commencement of, 398.
Markings of mastication, 909.
Marshall, H. G., on development of caries in dead teeth, 747.
Marshall, J. S., "Leucoplakia," 836.
Marshall, J. S., on Dr. Walker's "obscure case," 57.
  on dental education, 662.
  on electricity in dentistry, 214, 215.
  on histology of cementum, 834.
  on pyorrhea, 144, 760, 761.
Marsupial enamel, organic matter in, 532.
Marvin, C. A., on treatment of irregularities, 1014.
Maryland State Dental Association, annual meeting of, 568, 778, 855, 960.
Mason porcelain crowns, 313.
Massachusetts Board of Dental Examiners, new appointment to, 67.
  resolutions on death of Dr. McLeod, 78.
Massachusetts Board of Registration in Dentistry, meetings of, 152, 478, 969.
Massachusetts Dental Society, annual meeting of, 399.
Mastication, force exerted in, 127, 909, 994.
Materia medica, teaching of to dental students, 1042.
Matriculation of foreign students, reform needed in, 826.
Matrix, use of in filling-operations, 40, 41, 42, 43, 186, 223, 355, 452, 459, 681.
Maxfield, G. A., appointment of as dental examiner, 67.
  on amalgam as a filling-material, 212.
  on immediate extraction, 50.
  on physical characters of teeth, 446.
Maxilla, double resection of for protruding lower jaw, 552, 635.
Maxillæ, fractures of, 188, 235.
Maxillary bones, M. H. Cryer on, 881.
Maxillary sinus of the negro, 891.
Mayer, E., on buccal syphilis, 462.
Meacham, L. T., on hypnotism, 646, 649.
Mead, W. B., method of removing cemented pin from root, 415.
Mechanical dentistry in England and America, 596.
Mechanical forces, management of in regulating teeth, 298, 999.
Mechanical obstructions to development of teeth, 614.
Mechanics in dentistry, 819.
Medicine and dentistry, relations of, 576, 659.
Medicines, cataphoric action of, 214.
  non-efficacy of in disease, 211.
Medico-Chirurgical College of Philadelphia, rights of in conferring degrees, 481.
Meharry Medical College, Dental Department, commencement of, 398.
Mehlig's saliva controller, 221.
Meisburger, L., "Surgical Treatment of Alveolar Abscess," 454.
Mental control as a factor in management of patients, 644.
Mercurial stomatitis, 207.
  as a cause of pyorrhea, 546.
Mercury, affinity of aluminum for, 591.
  effect of on the oral mucous membrane, 208, 211.
Messerschmitt, F., "Several Cases of Corrected Irregularities of the Teeth, with Models and Appliances," 936.
Metal cap for jaw-fracture, 244.
Metal castings, fusible alloy for, 371.
Metal pins, use of in root-filling, 559.
Metal plates, swaging of with shot, 1013.
Methylen-blue staining method, 804.
Metric system, advantages of in formulating percentage solutions, 483.
Meyer, J. A., on treatment of jaw-fractures, 201, 202, 204.
Meyer, J. H., clinic by, 1012.
  on buccal syphilis, 467.
Microbe theory of dental caries, 662.
Micrometer tests for alloys, priority in, 935.
Micro-organisms, action of on enamel, 91, 519.
Microscopic anatomy of the tooth, 797.
Milk of magnesia as a dental obtundent, 55, 56.

Miller, Dr., on tooth-bleaching, 754.
Miller, W. D., "Caries of an Unerupted Tooth," 816.
  ideal agent for pulp-capping, 491.
  recovery of from recent illness, 155.
  theory of dental caries, 92, 448.
Milliamperemeter, value of, 13, 378.
Mills, G. A., on pyorrhea, 565.
Mills, W. A., on dental education, 967.
  on dental legislation, 779.
Milwaukee Medical College, Dental Department, commencement of, 682.
Minnesota State Dental Association, annual meeting of, 686.
  officers for 1898, 869.
Missouri Dental College, commencement of, 586.
Missouri State Dental Association, annual meeting of, 477, 782.
Mitchell, W. H., case of supernumerary tooth, 81.
Modelling compound, castings in, 372.
Models, construction of, for resection of maxilla, 637.
Moffitt generator, modification of, 222.
Molar, anomalous eruption of, 35.
  architectural design of, 609.
  roots, relation of to antrum, 902.
  types of in mammalian dentition, 253.
Mollusca, teeth of, 99.
Molyneaux, G., "A Clinic on a Fusible Alloy," 371.
  address by, 644.
  clinic by, 381.
  on silver nitrate in root-filling, 296.
Monson, G. S., "Constricted Vaults," 914.
Montell, W. A., on dental legislation, 779.
Moore, J. H., on immediate extraction, 48.
Moores, F. M., welcoming address, 866.
Morgan, F. H., treatment of alveolar pain after extraction, 600.
Morgan, W. H., on immediate extraction, 47.
Moriarty, P. W., "Fractures of the Lower Jaw and their Treatment," 235.
  models shown at clinic, 206.
Morrison, W. N., method of root-filling, 954.
Morton, W. J., "Cataphoresis, or Electric Medicamental Diffusion as Applied in Medicine, Surgery, and Dentistry," review of, 232.
  on cataphoresis, 617.
Mosher, E. M., "The Dentist's Posture at the Operating Chair; Its Influence upon the Health of the Body," 846.
Mouth as a source of systemic infection, 538, 628.
  embryonic development of, 103.
  manifestations of syphilis in, 431, 436, 459, 470, 479.
Mouth-breathing as a factor in pyorrhea, 545.
  dental irregularities caused by, 311.
Mouth-washes, desirable qualities for, 632.
Mucin, presence of in calculi, 2.
Mucous membrane, effect of amalgam fillings on, 209.
Mucous patches, significance of, 432, 437, 439, 460.
Mummery, J. H., on endings of pulp-nerves, 800.
  on formation of dentin, 487.
Mummifying paste, 499.
Muscle force, adjustment of in the human body, 847.
Muscular contraction in jaw-fractures, 235.
Muslin absorbents for filling-operations, 315.
Myers, C. G., clinic by, 381.
  on smooth-point pluggers, 183.
Myrrh, tincture of, in leucoplakia, 845.

NAGLE, Dr., on treatment of jaw-fractures, 200.
Narcosis as a symptom of cocain-poisoning, 766.
Nasal septum, prevalence of deformities of, 273, 900.
Nash, B. C., on buccal syphilis, 467.
  on pyorrhea, 564.
  on root-canal filling, 138.
  reads Dr. Talbot's paper, 756.
National Association of Dental Examiners, annual meeting of, 783.
National Association of Dental Faculties, action of on preliminary educational requirements, 873.
  annual meeting of, 685.
  report to on recognition of foreign degrees, 822.
National Dental Association, action of on patents in dentistry, 866, 872.
  annual meeting of, 476, 685, 866.
  editorial comments on meeting, 871.
  executive management of, 1048.
  officers for 1898, 869.
  proposed excursion to, 593, 693.
  qualifications of delegates, 398, 557.
National Dental Association, Southern Branch, W. E. Walker on, 641.
  action of on dental patents, 926.
  annual meeting of, 925, 1029.
  list of committees for joint meeting with Louisiana State Dental Society, 686.
  officers for 1898, 387.
National School of Dental Technics, annual meeting of, 1047.
National University Dental Department, commencement of, 587.
Neiswanger, C. S., "The Prominent Causes of Failure in the Use of Electricity in Dentistry," 9, 214.
  criticism of, 498.
Nephritis, connection of with pyorrhea, 563.
Nerve-endings in tooth-pulps, 797.
Neuralgia, defective vision as a cause of, 29.
  dental causes of, 660.
New Jersey dental law, 408.
  comments on, 403, 638, 691.
New Jersey dentists, notice to, 400.
New Jersey State Dental Society, annual meeting of, 400.
New Jersey summer examinations, 478.
New York Board of Dental Examiners, officers for 1898, 1046.
New York College of Dentistry, commencement of, 580.
New York dental law, amendments to, 489.
New York Dental School, commencement of, 588.
New York Institute of Stomatology, scientific criticism in, 85, 440.
New York Odontological Society, announcement of anniversary meeting, 968.
  monthly meetings of, 198, 312, 458, 558, 744, 1012.
New York State Dental Society, annual meeting of, 662, 763, 832.
Newton, H. D., on cocain, 958.
Nicholson, C. H., on amalgams, 936.
  on dental education of the public, 775.
  on regulating devices, 940.
Nitrate of silver in dentistry, 875.
Nitrous oxid, S. C. Pennington on, 18.
  experiments with at Johns Hopkins University, 497.
Noble, H. B., on dental legislation, 780.
  on formalin, 858.
  on immediate extraction, 47.
Noel, L. G., on pulp-treatment, 930, 932.
  use of sterilized thorns for filling root-canals, 222.
Nomenclature, conservatism in, 265, 269.
  of pyorrhea, 545.
Non-cohesive gold, use of in incisors, 279.
Nones, R. H., method of constructing duplicate denture in absence of patient, 664.
  on clasps for partial dentures, 668.

Norman, J. M., on pyorrhea, 760.
North Carolina State Dental Association, annual meeting of, 153.
  officers for 1898, 579.
North Dakota Board of Dental Examiners, annual meeting of, 590.
Northeastern College of Dental Surgery, commencement of, 584.
Northeastern Dental Association, annual meeting of, 37, 139, 206, 870.
Northern Illinois Dental Society, annual meeting of, 870.
Northern Iowa Dental Society, annual meeting of, 478.
  officers for 1898, 153.
Northrop, A. L., on porcelain inlays, 363.
Northrop dental library fund, 138, 370.
Northwestern University Dental School, commencement of, 391.
Nostrums, secret, advertising of, 330.

OBTURATORS, caution in placing of, 472.
Occlusal cavities, filling of, 911, 989.
Occlusion, plane of, 120.
Occlusive articulation, 82.
Occupation, effect of on shape of the head, 882.
O'Connor, M. J., obituary of, 790.
Ocular balance, disturbance of, 33.
Odontoblasts, function of, 801.
Odontographic Society of Chicago, anniversary meeting of, 152.
  officers for 1898, 227.
Odontological Society of Chicago, greetings to Southern Dental Association, 925.
Odontology, handbook of, 485.
Office training of dental students, 966.
Ohio College of Dental Surgery, commencement of, 395.
Ohio Medical University, Department of Dentistry, commencement of, 475.
Ohio State Dental Society, annual meeting of, 121, 286, 371.
  officers for 1898, 124.
Oil of cinnamon as a root-dressing, 1058.
Oil of cloves as a dental obtundent, 15, 332.
Oliver, R. T., greeting to Tri-State Meeting, 644.
Operative dentistry, causes of failures in, 927.
  influence of prosthetics on, 670.
Oral corns, 102.
Oral hygiene, W. A. Barrows on, 628.
Oral surgery, local anesthesia in, 923.
  practice of by dentists, 266, 325.
Oralist as a distinctive term, 325.
Organic matter in enamel, 486, 510, 532.
Organization, value of, 867.
Orthodontia, advances in, 995.
Orthoform as an anesthetic, 161.
Osmosis, phenomena of, 616.
Osmun, J. A., on treatment of sensitive dentin, 162.
Osseous tissue, relation of cementum to, 697.
Ottolengui, R., gold-filling at clinic, 218.
  modification of Bean splint, 203.
  on gold fillings, 427, 428.
  on porcelain inlays, 364.
  on secret remedies, 571.
  on toxic effect of cocain, 766.
  on treatment of carious approximal surfaces, 41.
  on treatment of irregularities, 1016, 1020.
  on work of examining boards, 116.
  reply to by Dr. Guptill, 285.
  report on prosthetic dentistry, 662.
  work of in opposition to dental patents, 401, 866, 926.
Owens, J. R., clinic by, 381.
Oxyphosphate of zinc as a filling-material, 677, 1022.

PAGE, E., on amalgam fillings, 210.
Pain, avoidance of in dental operations, 910.
  limit in cataphoresis, 373.
  significance of in dental caries, 355.
Painless dentistry, L. S. Goble on, 14.
  discussion on, 54.
  progress in, 295.
Palate, syphilitic infection of, 437.
Palato-maxillary index, 260.
Palmer, D., clinic by, 559.
  on root-filling, 559.
Palmer, E., on treatment of root-canals, 317.
  paper read by, 1046.
Palmer, S. B., on amalgam alloys, 17.
  on leucoplakia, 843.
  on physical characters of teeth, 446.
Palmer, T., on amalgam as a filling-material, 212.
Parabolic form of dental arch, 259.
Paraform, generation of formalin from, 539, 855.
Parker, J. C., on hypnotism in dentistry, 651.
Parker, L., on immediate extraction, 48.
Parmele, G. L., "Extracting Teeth during Acute Pericementitis," 46.
Parramore, T. H., new scalers for pyorrhea, 222.
Parrott teeth, 439.
Parsons, J. H., on care of children's teeth, 952.
  on pyorrhea, 758.
Partial crowns, 673.
Patent laws, proposed amendment of, 401.
Patents in dentistry, 401, 866, 872.
Pathological researches in dentistry, 594.
Patients, control of by suggestion, 645.
  idiosyncrasies of, 62, 213, 724, 765, 941.
  position of for hypodermic injection, 348.
Patrick, J. J. R., studies of teeth of aborigines, 255.
  work on dental history, 23.
Patterson, J. D., on immediate extraction, 46.
  on the delegate system in National Dental Association, 866.
Payne, R. E., implantation clinic, 219.
  method of flushing the antrum, 222.
Payne, R. G., on bleaching with cataphoresis, 384.
Peabody, F., method of root-filling, 955.
Pearsoll, W. B., "Mechanical Practice in Dentistry," review of, 596.
Pearson, A. A., on examining boards, 1036.
Pearson, J. A., "What Shall We Do?" 141.
Pease, C. G., on buccal syphilis, 471.
  on extraction of first permanent molars, 1025.
  on malformation of the dental arch, 311.
  on root-canal filling, 136.
Peck, A. H., on hydrogen dioxid, 1041.
  on leucoplakia, 860.
  on management of pulpless teeth, 958.
  on teaching materia medica, 1044.
Pecuniary returns of dental colleges, 343.
Pedantry in the dental office, 943.
Peirce, C. N., case of caries in an unerupted tooth, 816.
  on immediate extraction, 49.
  on pyorrhea, 145, 146, 147, 304, 484.
  resolution of sympathy for Dr. Cushing, 866.
Pennington, S. C., "Nitrous Oxid," 18.
Pennsylvania Board of Dental Examiners, annual meeting of, 328, 478.
  officers for 1898, 1048.
Pennsylvania College of Dental Surgery, commencement of, 388.
Pennsylvania State Dental Society, annual meeting of, 476.
Percentage solutions, formulation of, 483.
Pericemental abscess, etiology of, 621, 625, 969.
Pericementitis, immediate extraction in, 46.
Pericementum, destruction of by calculi, 6.
  development of cementum from, 833.

Peridental membrane, blood and nerve supply of, 660.
Perine, G. H., work on dental history, 23.
Periodical dental literature, control of by supply houses, 688.
Periosteum, destruction of in pyorrhea, 307.
Peripheral enamel margin, 730.
Perrett, W. E., on gold and cement fillings, 743.
Perry, S. G., on buccal syphilis, 464, 466, 469.
  on porcelain inlays, 365.
  on reciprocating tooth-movement, 199.
  on the term stomatology, 320.
  on tooth-bleaching, 754.
  on use of wax in root-filling, 317, 325.
Personal equation, influence of, 724.
Perspiring hands, treatment of, 245.
Phagedenic pericementitis, 7, 969.
Phantom toothache, 47.
Pharmaceutical schools, preliminary requirements for, 340.
Philadelphia Dental College, commencement of, 393, 582.
  meeting of Alumni Society, 473.
Phosphates, influence of on tooth-structure, 506.
Photo-micrography, T. P. Hinman on, 149.
Physical exercise for the dentist, 854.
Physicians, duty of to the dentist, 435, 460, 576.
Piers for bridge-work, 933.
Pigmentation of enamel, significance of, 521.
Pike, C. E., obituary of Dr. Boice, 234.
Pin-head cavities, filling of, 422.
Pins, cemented, removal of from root or crown, 415.
Pittsburg Dental College, commencement of, 387.
Pivot teeth, use of porcelain enamel for, 635.
Plaster, use of in repair of rubber plates, 672.
Plastic fillings, A. Osgood on, 675.
  discussion on, 679.
Platina-gold foil, clinical demonstration of, 218.
Platinum cap, adaptation of Logan crown to, 744.
Pliers, new, 222.
Pluggers, choice of for hand-burnishing, 170.
Pneumatic mallet, new, 559.
Pohlman, W. H., application of gold surface to metals without aid of battery, 222.
Poisons as medicines, 763.
Porcelain crown, banded, 1009.
Porcelain facings, fracture of in bridge-work, 834.
  removal of, 143.
  replacing of, 164.
Porcelain inlays, E. T. Darby on, 360.
  N. S. Jenkins on, 633.
  discussion on, 363.
Porcelain teeth, investment of, 975.
Porter, G. L., address by, 66.
Posture at the operating chair, E. M. Mosher on, 846.
  discussion on, 849.
Pravaz syringe for hypodermic injection, 349.
Preliminary requirements for dental students, standard of, 339.
Premature extraction, evils from, 864.
Prescription incompatibility, 600.
Preston, A. E., "Aluminum Crowns," 550.
Price, L. D., abnormal teeth of, 445.
Price, W. A., "Some Hard Cases for Cataphoresis, with Suggestions," 373.
  on electricity in dentistry, 216, 616.
  on silver nitrate in root-filling, 296.
Primary batteries, disadvantages of for cataphoresis, 129.
Primary syphilitic ulcer, 437.
Professional journalism, 688.
Professional schools, relative numbers of, 338.
Prognathism, degrees of, 258.
Prognosis of alveolar abscess, 454.
Proseus, F. W., "The Profession and its Relations to the Artisan and to the Layman," 769.
Prosthetic dentistry, advances in, 216.
  discussion on, 670.
  imperfect instruction in, 116.
  report on at New York State Dental Society, 662.
  suggestions in, 366.
Ptychodont type of molars, 253.
Public interest in dental laws, 569.
Pulp-capping, ideal agent for, 491.
Pulp-exposure, treatment of, 932, 953.
Pulpitis, ammonol in, 309.
Pulpless teeth, A. P. Burkhart on treatment of, 775.
  W. T. McLain on treatment of, 131.
  J. Taft on management of, 952.
  caries in, 450.
Pulp-removal, effect of on life of tooth, 290, 291.
Pulps, painless removal of, 16.
Pulp-treatment, W. D. Snyder on, 293.
  J. Taft on, 133.
  formalin in, 346.
  of deciduous teeth, 952.
Pus, burrowing of, 50.
  significance of in pyorrhea, 761.
Pyorrhea alveolaris, G. T. Carpenter on, 757.
  A. W. Harlan on, 543.
  G. H. Thompson on, 304.
  D. Whittles on, 971.
  discussion on, 63, 144, 305, 560, 758.
  etiology of, 625, 631.
  root-deposits in, 313.
  synonyms of, 545.
Pyrozone as a bleaching agent, 749.
  as a local anesthetic, 959.
  cataphoric use of, 752.
  in root-filling, 136, 138.

Quattlebaum, E. G., on burs, 928.
  on examining boards, 1035.
  on pulp-treatment, 929, 930, 931, 932.
Quebec Dental Association, officers for 1898, 1047.
Quonehtacut Dental Club, annual meeting of, 66.

Reading Dental Society, organization of, 870.
Reciprocating tooth-movement, H. N. Dodge on, 196.
  discussion on, 198.
Reclus, P., use of local anesthesia in surgery, 348.
Records, preservation of in dental societies, 124.
Register, J. E., method of using amalgams, 677.
Regulating appliances, 197, 936.
  fitting of to models, 220.
Remondino, P. C., paper read by, 1046.
Removable bridge-work, case of, 836.
Removable-facing crown- and bridge-work, H. W. Howe on, 920, 1059.
Replantation, a question in, 81.
Requa, L., on plastic fillings, 680.
Resistances, materials for in cataphoric work, 499.
Retina, function of, 31.
Retzius on innervation of the tooth-pulp, 803.
Rhein, M. L., on leucoplakia, 843.
  on pyorrhea, 560, 562, 565.
  on root-deposits in pyorrhea, 313.
  on the term stomatology, 321, 322.
  on tooth-bleaching, 753.
  on treatment of jaw-fractures, 202, 204.
  on toxic effect of cocain, 767.
Rheumatism as a factor in pyorrhea, 544.
Rhinologists, bad surgery by, 905.

Rice, C. C., on buccal syphilis, 463.
Rich, J. B., on dental legislation, 781.
 on formalin, 858.
 loss of membership in Washington City Dental Society, 866.
Richardson, W. E., obituary of, 331.
Richmond, G. P., obituary of, 790.
Richmond crown, broken, removal of, 143.
 criticism of, 947.
 repairing of, 415.
 replacing of, 164.
Rider, W. J., on immediate extraction, 47, 52.
 on treatment of carious approximal surfaces, 40.
Riggs, J. M., treatment of pyorrhea, 306, 307.
Risley, S. D., examination of eyes of school-children, 28.
Rood, F. M., "Some Practical Points in Crown- and Bridge-Work," 933.
 method of porcelain facing on gold crowns, 56.
 on plastic fillings, 681.
 on treatment of pulpless teeth, 778.
Root-canal dressings, insertion of, 162.
Root-canal filling, discussion on, 134, 289, 295.
 improved methods of, 559, 954.
Root-forms, modification of, 610.
Roots, resorption of in pyorrhea, 561, 564, 566.
Röse on nerve-endings in tooth-pulps, 799.
Routine methods in tooth-filling, 723.
Royal College of Dental Surgeons of Ontario, commencement of, 585.
Royce mallet-points, advantages of, 221.
Rubber as a separator, 727.
Rubber bands, use of in regulating teeth, 299.
Rubber-dam, sandarac varnish for retention of, 78.
 substitute for, 315.
 use of in pulp-removal, 292.
Rubber matrix, improvised, 162.
Rubber plates, alleged mercurial poisoning from, 212.
 duplication of in absence of patient, 663.
 removal of teeth from, 78.
Ruggles, S. D., "The Preparation of Compound Cavities in Anterior Teeth," 124.
 clinic by, 381.
Russell magnetic mallet, 221.

SACCHARIN as a germicide, 632.
St. Louis Dental Society, officers for 1898, 152.
Salicylic acid in root-treatment, 956.
Saliva controller, new, 221, 315.
Saliva, syphilitic contamination of, 439.
Salivary calculi, 3.
 formation of, 788.
Salivary deposits in pyorrhea, 545.
Saloga, A., on eucain in dentistry, 1054.
Sandarac and cotton as a root-filling, 778.
Santoine, S., powder for difficult dentition, 245.
Sarrazin, J. J., "Matrix Contouring," 355.
 on pyorrhea, 144.
Sawins, A. H., on teaching materia medica, 1044.
Scalers, new, for pyorrhea, 222.
Schering formalin sterilizer, 857.
Schleich, C. L., experiments with cocain, 742.
School-children, dental care of, 658, 771, 951.
Schreier's preparation in tooth-bleaching, 753.
Schroeder on coagulating property of formalin, 345.
Scientific criticism, J. Leon Williams on, 85.
Scientific terms, spelling of, 36, 247.
Scientific work in dentistry, 549.
Scott, J. S., clinic by, 206.
Scrap amalgam, reworking of, 17.
Secret and proprietary preparations, distinction between, 330.
Senile changes a cause of pyorrhea, 144.
Sensitive dentin, pathology of, 355.
 treatment of, 162, 374, 385.
Sensory nerve-fibers, termination of, 803.
Separators, use of in filling-operations, 727.
Serumal calculi, 5.
Seventh District Dental Society of New York, annual meeting of, 575, 675, 769, 933.
Sexual tooth, 110.
Shanasy, W. T., on nitrate of silver in dentistry, 875.
Sharpey's fibers, 718.
Sheriff, E. W., paper read by, 1046.
Shields, N. T., on methods of filling, 1027.
 on root-canal filling, 135, 136.
Shumway, T. D., on tin as a filling-material, 359, 744.
Shunt controllers in cataphoresis, 131.
Sibley, F. L., on dental education of the public, 772.
Siddall, W. A., clinic by, 381.
Silk thread ligature, advantages of, 63.
Sill, C., on preparation of cavities, 928.
 on pulp-treatment, 930.
Silver as a base-plate material, 366, 369.
Silver alloys, shrinkage of, 935.
Silver nitrate, cataphoric use of, 289, 292, 296.
 use of in root-canals, 288, 291, 296, 875.
Silver plates, tinning of, 791.
Silver wire, therapeutic action of, 559, 562, 566.
Sinton, W. K., on dental education, 662.
 on hydrogen dioxid, 1039.
 on pyorrhea, 759.
 welcoming address by, 657.
Sixth District Dental Society, withdrawal of from union convention, 309.
Skin eruptions of syphilis, 437.
Slip matrices, Hodson's, 452.
Smith, A. G., on examining boards, 246.
Smith, B. H., gold annealer, 222.
 on dental legislation, 778, 781.
 on Dr. Black's scientific work, 86.
 on examining boards, 1033.
 on immediate extraction, 53.
 on physical characters of teeth, 444.
 on pulp-treatment, 931.
Smith, D. D., on pericemental abscess, 621.
Smith, H., on the odontoblasts, 800.
Smith, H. A., on coagulants in root-filling, 290.
 on correction of irregularities, 302.
 on hypnotism, 655.
Smith, H. T., "The Coagulation Theory," 286.
 on immediate extraction, 48.
Smith, M. C., on amalgam as a filling-material, 212.
Smith, M. S., on prosthetic dentistry, 674.
Smith, S. E., welcoming address, 925.
Smith, W. C., on painless dentistry, 55.
Smith, W. W., "A Few Incidents and Their Lessons," 576.
 on plastic fillings, 681.
Smithers, W. W., on legal right of dentists to prescribe, 574.
Snyder, A. G., demonstration of physical exercises, 849.
Snyder, W. D., "That Troublesome Nerve," 293.
Söderberg's mummifying paste, modification of, 499.
Sodium chlorid, use of in root-filling, 290.
Solder for gold crown-work, 368.
Solila gold, advantages of for hand fillings, 423.
 clinical demonstration of, 220.
Southern California Dental Association, officers for 1898, 1045.

Southern California Dental Association, organization of, 682.
Southern Dental Association, annual meeting of, 57, 144, 213.
  disbandment of as separate organization, 223, 641, 920.
  Transactions for 1897, notice of, 488.
Southern Kansas Dental Association, annual meeting of, 1048.
Southern Medical College, Dental Department, commencement of, 583.
Southern Wisconsin Dental Association, annual meeting of, 328.
Southwick, A. P., obituary of, 597.
  use of copper amalgam, 676.
Spatulas, cement, 678.
Specialism in medicine, 659.
Specialization, effect of on animal life, 101.
Specialties in dentistry, 38.
Spinal column, formation of in man, 849.
Splints, interdental, for jaw-fracture, 192, 241.
  retaining, in pyorrhea, 565.
Sponges, food of, 96.
Squires, G. B., on spelling of scientific terms, 36, 247.
Stainton, C. W., "A Comparison, with Suggestions," 1005.
  on painless dentistry, 55, 56, 385.
  paper read by, 56.
Stanchions of teeth, 606.
Stanley, C. C., on dental surgery in the army and navy, 558.
Stanton annealing burner, 182.
Starr, A. R., on buccal syphilis, 467.
  on treatment of irregularities, 1019.
  on use of oxyphosphate, 1027.
Stellwagen, T. C., "Dentistry or Stomatology," 265.
  appliances for dental practice, 315, 317.
  on immediate extraction, 47.
Step, formation of in filling-operations, 814, 991.
Stephan, J. F., clinic by, 381.
Steurer, J. A., improvements in plastic gold, 312.
Stockwell, C. T., on immediate extraction, 52.
Stomatitis, differentiation of from gingivitis, 457.
  mechanical cause of, 213.
Stomatological Section of American Medical Association, annual meeting of, 657, 757, 859, 948, 1037.
Stomatology as a distinguishing term, T. C. Stellwagen on, 265, 318, 323, 325, 484.
  discussion on, 318.
Stone, Prof., lantern exhibit by, 379.
Stool, advantages of to the dentist, 850.
Storage batteries, development of, 128.
  use of for cataphoresis, 128.
Stowell, S. S., "Dental Bridge-Work, Fixed and Removable," 834.
  formula for pulp-capping, 930.
  on malformation of the dental arch, 311.
  on treatment of carious approximal surfaces, 80.
  use of hydronaphthol in pulp-capping, 678.
Straight, M. B., on painless dentistry, 54.
Stratification of enamel, 527.
Straut, J. M., universal matrix-holder, 222.
Straw, L. S., use of copper amalgam, 678.
Students, preliminary qualifications for, 818, 873.
  relative numbers of in the professions, 341.
Stumph, Dr., filling-operation at clinic, 220.
Sudduth, W. X., on the odontoblasts, 801.
  on organic matter in enamel, 90.
Suggestion, control of patients by, A. Jameson on, 644.
  discussion on, 650.
Sulfuric acid as a dental obtundent, 50.
  use of in pyorrhea, 560, 566.
  use of in root-canals, 955.
Sumner, F. I., on painless dentistry, 56.
Surgery, use of local anesthetics in, 348.
Surgical treatment of alveolar abscess, 454.
  of jaw-fracture, 191, 241.
  of leucoplakia, 842.
  of pyorrhea, 760.
Sweeny, A. W., "Dental Laws and what They have Accomplished," 568.
  on dental legislation, 782.
  on formalin, 858.
Sweetman, Dr., on hypnotism, 655.
Sweetser, R. W., "A New Method for an All-Porcelain Banded Crown," 1009.
Swift, A. L., on buccal syphilis, 471, 472, 473.
Syphilis in the mouth, L. D. Bulkley on, 431, 468.
  F. D. Weisse on, 436, 470, 471, 472.
  as a factor in pyorrhea, 545, 546.
  discussion on, 459, 470.
Systemic diseases, treatment of by dentists, 779.
Systemic treatment in pyorrhea, 145, 305, 329.

TACOMA College of Dental Surgery, commencement of, 585.
Tactile sensibility of teeth, 110.
Taft, C. A., on amalgam fillings, 207, 213.
Taft, J., "Management of Pulpless Teeth," 952.
  on care of children's teeth, 951.
  on coagulants in root-filling, 290, 291.
  on dental education, 661.
  on hydrogen dioxid, 1041.
  on hypnotism, 656.
  on leucoplakia, 861.
  on posture at the operating chair, 851.
  on pulp-treatment, 133.
  on pyorrhea, 759, 760, 761.
  on teaching materia medica, 1044.
Talbot, E. S., "Degeneracy, in its Relation to Deformities of the Jaws and Irregularities of the Teeth," 734.
  lecture by, 859.
  on dental education, 661.
  on leucoplakia, 860, 861.
Tartar, removal of in pyorrhea, 545, 561.
Tartarlithine in pyorrhea, 148.
Taylor, Dr., on amalgam as a filling-material, 211.
Teaching, principles of, 964.
Technic standard, establishment of for college entrance, 818.
Technical terms, coining of, 269.
Teeth, H. H. Burchard on architecture of, 605.
  C. N. Johnson on filling of, 723, 811, 907, 987.
  accommodation of in the dental arch, 915.
  anchorage of, 106.
  anomalous, 281.
  as living organs, 351.
  bleaching of by cataphoresis, 383, 748.
  deciduous, treatment of, 862, 948.
  definition of, 97.
  degeneration of from faulty food, 139.
  degrees of wear of, 260.
  development of, 949.
  distribution of in the organic world, 95.
  elongation of in pyorrhea, 631.
  extraction of in pyorrhea, 562, 565.
  faulty nomenclature of, 103.
  identification by means of, 113.
  immediate extraction of, 46.
  increased frequency of accidents to due to athletics, 198.
  investments, W. S. How on, 975.
  novel method of filling, 413, 601.
  periods of eruption, 865.
  personal care of, 631.
  physical characters of, 441, 505.
  pulpless, treatment of, 131, 775.
  reciprocating movement of, 196.
  regulation of, 207, 936, 1014.
  removal of from rubber plates, 78.

Teeth, retention of in jaw-fractures, 190.
  sacrifice of for bridge-work, 672, 933.
  saving of, 44.
  separation of, 726, 988.
  successional series of, 106.
  syphilitic infection from, 461, 468.
  types of in mammalian dentition, 253.
  typical, 104.
  varied functions of, 110.
Tenison, W. D., on root-canal filling, 135.
Tennessee Dental Association, annual meeting of, 477.
Tennessee Dental Examining Board, annual meeting of, 477.
Tennessee Medical College, Dental Department, commencement of, 397.
Tertiary syphilis, oral manifestations of, 438, 461.
Texas Dental Association, annual meeting of, 327.
  officers for 1898, 783.
Text-books, shortcomings of, 548.
Thackston, W. W. H., "The Misapplication of Gold Crown- and Bridge-Work," 216.
  report on necrology, 223.
Thomas, J. D., on immediate extraction, 51.
Thompson, A. H., on identification by means of the teeth, 114.
Thompson, G. H., "Alveolar Pyorrhea," 304.
Thompson, J. S., on electricity in dentistry, 214.
Thorns, sterilized, for root-canal filling, 222.
Thycalol as a mouth-wash, 632.
Tibone, Dr., on toxic action of cocain, 741.
Tin as a filling-material, E. T. Darby on, 358.
  T. D. Shumway on, 744.
  annealing of, 746.
  discussion on, 359.
Tipping teeth, 674.
Tobacco as an exciting cause of leucoplakia, 838, 861.
  prohibition of in gingivitis, 458.
Todd, W. H., clinic by, 381.
Tomes, C. S., "Dental Anatomy," review of, 485.
  appointment of to General Medical Council of Great Britain, 592.
  criticism of recent scientific work, 86, 442, 447.
  on Bonwill's system of measurements of the teeth, 831.
  on calcification of teeth, 109.
  on nerve-endings in tooth-pulps, 799.
  studies on physical characters of teeth, 509, 531.
Tomes, J., "System of Dental Surgery," review of, 232.
  on the dental arch, 272.
Tompkins, H. H., on painless dentistry, 55.
Tongaline, use of in gouty pyorrhea, 329.
Tongue, proper cleaning of, 630.
Tooth, supernumerary, 81.
  insulation of for cataphoresis, 378.
Tooth-brush, use and abuse of, 631, 758.
Tooth-crown, readjustment of on natural root, 196.
Tooth-forms, evolution of from primitive cones, 612.
Tooth-movement, S. H. Guilford on, 995.
  discussion on, 1014.
Toothpicks, wooden, in pulp-devitalization, 316.
Tooth-pulps, innervation of, 797.
Tooth-structure as a cause of dental caries, 87, 441.
  degeneration of, 88.
Townsend, E. L., paper read by, 1046.
Townsend, S. M., on care of children's teeth, 951.
Toxins, action of on nutritive processes, 624.
Toys as a source of contagion, 440.
Tribromphenol-bismuth, a new antiseptic, 309, 317.
Trichloracetic acid in pyorrhea, 546, 565.
Tri-State Dental Association, organization of, 1047.
Tri-State dental meeting, 328, 643, 846.
Trueman, W. H., work on dental history, 25.
Truman, J., criticism of Dr. Williams's work reviewed, 86.
  on coagulants in root-canals, 288.
  on physical characters of teeth, 447.
  response to welcoming address, 866.
Tubular enamel, 486.
Turner, Sir W., on the dental arch, 260.
Tusks, extreme development of, 111.
Typical skull, illustration of, 883.

ULCER, syphilitic, 437.
Ulcerous stomatitis, diagnosis of, 457.
Undercuts for gold fillings, 421.
Unilateral occlusion, specimen of, 904.
University of Buffalo, Dental Department, action on death of Dr. Southwick, 598.
  commencement of, 582.
University of California, College of Dentistry, commencement of, 870.
University of Colorado, Dental Department, commencement of, 587.
University of Denver, Dental Department, commencement of, 589.
University of Iowa, Dental Department, commencement of, 683.
University of Maryland, Department of Dental Surgery, commencement of, 396.
University of Michigan, College of Dental Surgery, commencement of, 684.
University of Minnesota, Dental Department, commencement of, 584.
University of Pennsylvania, Department of Dentistry, commencement of, 581.
University of Tennessee, Dental Department, commencement of, 476.
University training, desirability of, 823.
Uric acid diathesis in pyorrhea, 145, 304.
  relation of to dental erosion, 974.
U-shaped form of dental arch, 259.
Usher, J. T., "Some Suggestions in Prosthetic Dentistry," 366.

VALVULAR obstruction to discharge of pus from abscessed tooth, 332.
Van Deman on innervation of the tooth-pulp, 803.
Van Vleck, W. B., obituary of, 235.
Van Woert, F. T., fitting platinum cap over root, 744.
  on porcelain inlays, 363.
  on prosthetic dentistry, 672.
  on tooth-bleaching, 750, 751, 752.
  on toxic effect of cocain, 768.
  porcelain crown-work, 313.
Vanderbilt University, Department of Dentistry, commencement of, 475.
Vapocaine, a new dentinal obtundent, 1057.
Varley, E. W., on care of children's teeth, 951.
  on hydrogen dioxid, 1039.
Velo-palatal insufficiency, cases of, 275.
Vermont State Board of Dental Examiners, annual meeting of, 67, 784.
Vermont State Dental Society, annual meeting of, 153.
  officers for 1898, 386.
Vertebrates, similarity of structure in, 102.
Virginia State Dental Association, annual meeting of, 568, 778, 855, 960.
Volasem as an antidote to cocain, 742, 923.
Volk, A. J., on dental legislation, 781.
Voltage, definition of, 10.
Von Hoffmann, discovery of formaldehyd, 344, 537.
Vulcanite plates, repair of, 666.
  use of in regulating teeth, 1017.
Vulcanite splints for jaw-fracture, 241.
Vulcanizing on silver, methods of, 366, 369.
Vulnerable point of approximal fillings, 729.

WAITT, J. E., clinic by, 206.
Walker, W. E., cases of alveolar abscess, 621.
  demonstration of facial clinometer, 219, 222.
  on articulation and occlusion, 119.
  on burs, 927, 928.
  on examining boards, 1035.
  on organization of Southern Branch of National Dental Association, 641.
  on pyorrhea, 144, 148.
  on treatment of sensitive dentin, 932.
Walker, W. W., on plastic gold, 312.
  on root-canal filling, 136.
Walker granular gum, objections to, 163.
Wallenberg on leucoplakia, 839.
Walrus, enamel on tusks of, 265.
Ward, C. H., "Human Teeth from a Comparative Standpoint," 95, 253.
Ward, S. M., on lycetol, 245.
Washington City Dental Society, annual meeting of, 568, 778, 855, 960.
  officers for 1898, 151.
Washington Dental College, commencement of, 588.
Washington State Dental Society, annual meeting of, 399.
  officers for 1898, 579.
Water as a sterilizer, 942.
  as an anesthetic, 959.
Watkins, S. C. G., new antiseptic for root-canals, 317.
  on malformation of the dental arch, 311.
  on porcelain inlays, 363.
  on tin as a filling-material, 359.
  on the term stomatology, 320.
  use of ammonol in pulpitis, 309.
Waugh, D. H., on formalin, 383.
  on systemic disorders from dental conditions, 579.
Wax, use of in root-filling, 316, 325.
Weber, A. G., method of folding gold foil, 877.
Webster, C. P., "One Cause of Dental Degeneracy: The Physical Relation of Food to the Teeth," 139.
Wedelstaedt, E. K., on identification by means of the teeth, 114.
Wedges, use of in approximal fillings, 225, 226, 728.
Weights, adjustment of in the human body, 847.
Weiss, Dr., on the term stomatology, 325.
Weisse, F. D., "Buccal Manifestations of Syphilis," 436.
  "Fractures of the Maxillæ," 188.
  on immediate extraction, 49.
Weld, G. W., on root-canal filling, 135, 136, 137, 138.
  paper read by, 379.
Wells, D. W., "Visual Defects of Dentists," 27.
Werner, J. G. W., clinic by, 206.
  on amalgam as a filling-material, 213.
  on treatment of carious approximal surfaces, 41, 45.
West Virginia State Board of Dental Examiners, annual meeting of, 328.
Western Dental College, commencement of, 393.
Western Dental Journal, comments on term stomatology, 484.
Western Reserve University, College of Dentistry, commencement of, 586.
Wetherbee, I. J., on amalgam as a filling-material, 211.
Whipple, J. W., "Double Resection of the Inferior Maxilla for Protruding Lower Jaw," 552.
White, G., on immediate extraction, 52.
  on pyorrhea, 63, 64.
  on unerupted teeth, 58.
  report on new appliances, 221.
White, W. A., on amalgams, 935, 936.
  on dental education of the public, 774.
  on plastic fillings, 682.
  on toxic effect of cocain, 765.
Whitney, J. M., on teeth of the Hawaiians, 139.
Whitslar, W. H., on posture at the operating chair, 849.
Whittles, D., "A Preliminary Review on Progressive Infective Ulceration of the Periodontium or Alveolar Dental Membrane," 971.
Wilbur, W. C., on painless dentistry, 56.
Wilder, D. R., chalk talk, 1046.
Willard concentric cell battery, 131.
Williams, Jacob L., on immediate extraction, 51.
Williams, J. Leon, "On Structural Changes in Human Enamel; with Special Reference to Clinical Observations on Hard and Soft Enamel," 505.
  "Scientific Criticism and the New York Institute of Stomatology," 85.
  forthcoming papers by, 968.
  investigations on dental caries, 382, 448, 450, 660.
  review of Tomes's "Dental Anatomy," 485.
Wilson, G. H., clinic by, 381.
  method of constructing duplicate denture in absence of patient, 664.
Wind instruments, advantage of in lung-exercise, 853.
Wire frame for teeth investment, 975.
Wisconsin State Dental Society, annual meeting of, 477.
Wolf, J. L., on Libby's gold-pluggers, 221.
Women as laboratory assistants, 634.
  in dentistry, 850.
Wooden nerve-broaches, 315, 317.
Woodley, J. R., presentation of picture to Southern Dental Association, 59.
Wood's metal, formula of, 371.
Woodward, Marion N., "Books and the Dentist," 206.
Words, proper use of, 303.
World's Columbian Dental Congress, neglect of dental history by, 23.
Worms, teeth of, 97.
Wright, A. F. S., on pyorrhea, 147.
Wright, A. M., on prosthetic dentistry, 673.
Wright, J. F., on immediate extraction, 51.

YORK, E. L., experiments with coagulants, 287, 289.
Young, G. A., clinic by, 206.

ZINC chlorid as a germicide, 135.
Zoological Chauvinism, 113.

# ADJUSTABLE FOUNTAIN SPITTOON.

Patented May 24, 1881, and March 20, 1883.

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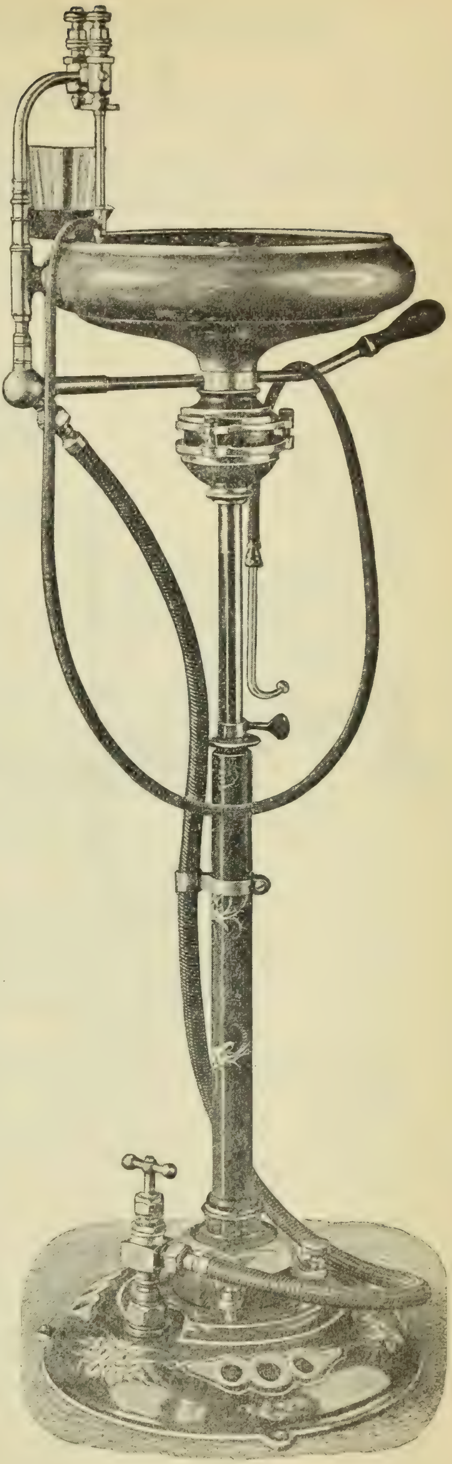
In the Adjustable Fountain Spittoon, the basin is mounted on a telescoping standard, ball-and-socket joints at the top and bottom of which give it a universal adjustment. The water supply is governed by a globe valve in the base and passes to the basin through silk-covered rubber tubing, the standard acting as a conduit for the waste water. The top of the basin in its lowest adjustment is 29 inches from the floor; at its highest, 44 inches. In the former position the center of the basin may be placed anywhere within a circle 13 inches in diameter; at its greatest height this circle is 23 inches in diameter. Within these limits the basin may be locked at any point or inclination. Diameter of basin at mouth 10½ inches. Gold-trap at the upper ball-and-socket joint.

The appliance is well made and handsomely finished, the base and standard japanned and ornamented.

For prices see page 4.

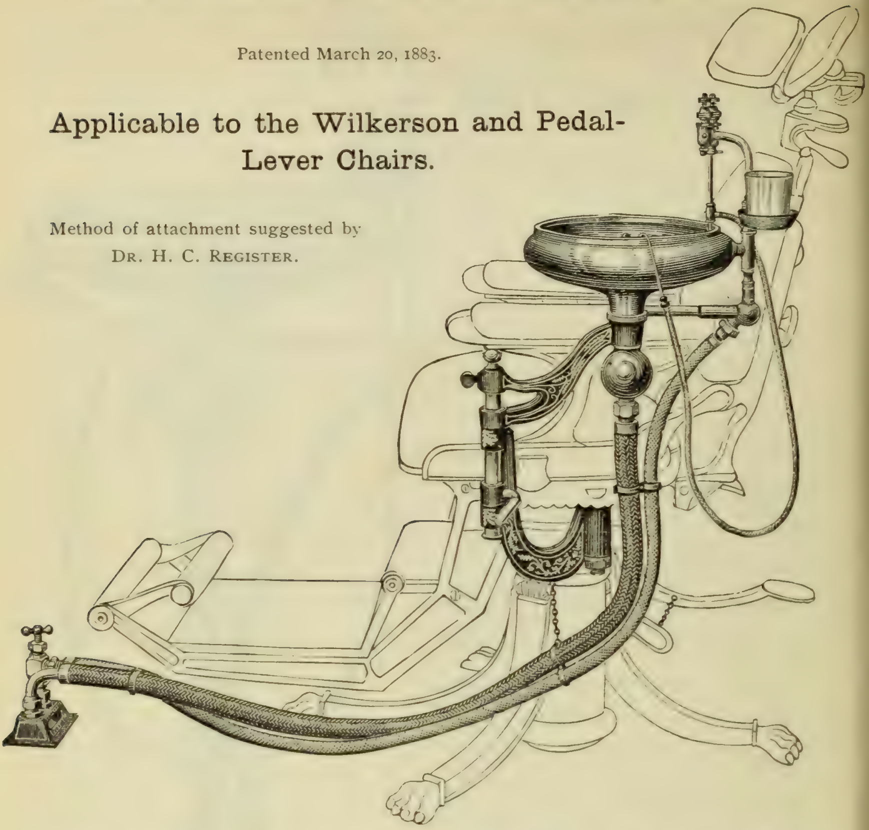


# ATTACHED FOUNTAIN SPITTOON.

Patented March 20, 1883.

## Applicable to the Wilkerson and Pedal-Lever Chairs.

Method of attachment suggested by
Dr. H. C. Register.



Where a supply of running water is available, either from private tank or public water pipes, a Fountain Spittoon is almost a necessity to a well-fitted-up office. In fact, it is so much more cleanly and convenient than the ordinary cuspidor that the dentist will feel well repaid for the expense of preparing specially, when necessary, for the installation of a Fountain Spittoon.

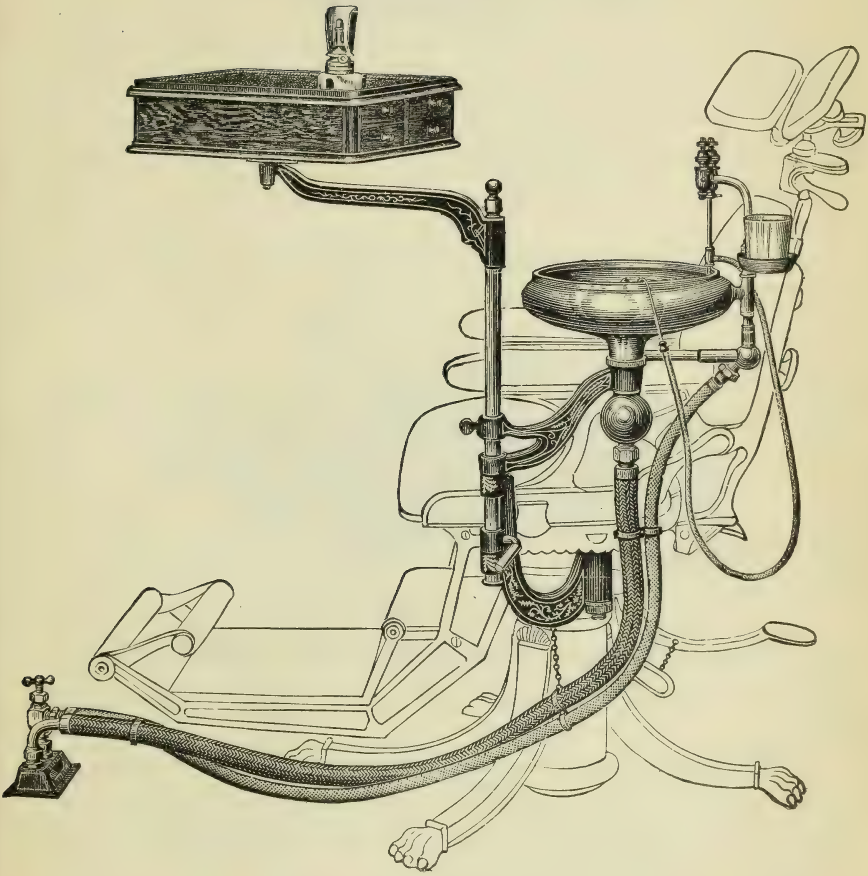
Two general styles are made, the Attached and the Adjustable; the former for attachment to the operating chair, the latter to be set wherever most convenient. Varieties in both styles are specified in the prices.

The basin is ten and one-half inches diameter at the mouth, and has a depth of three inches. A double jet tube revolves in the center of the basin, throwing two small streams which form a sheet of water across its diameter. All metal parts of the Spittoon proper are nickel-plated. The rubber tubing is silk-covered. The illustrations show the double faucet and saliva ejectors. Either form can be had without the saliva ejector, and with single faucet for water supply only. Gold-trap or not, as you please, in the Attached; always in the Adjustable. The bringing of the intake of the water supply pipe and the outlet of the waste pipe close together in the bases of the respective forms, reduces the plumbing work to the connection of the base with the outside supply and waste pipes.

For prices see page 4.

# ATTACHED FOUNTAIN SPITTOON WITH BRACKET TABLE.

Patented March 20, 1883.



The combination shown above meets the wants of those who prefer a bracket and table attached to the chair, and will be found especially useful in offices where the bracket cannot be conveniently attached to the wall.

For prices see page 4.

# FOUNTAIN SPITTOONS.

## PRICES.

**Attached.** As shown page 2.

| | |
|---|---|
| Fountain Spittoon complete, with Saliva Ejector and Gold-Trap | $60.00 |
| “ “ “ “ “ “ without Gold-Trap. | 57.00 |
| “ “ with Double Faucet, without Saliva Ejector, with Gold-Trap | 55.00 |
| “ “ with Double Faucet, without Saliva Ejector or Gold-Trap | 52.00 |
| “ “ with Single Faucet, with Gold-Trap | 50.00 |
| “ “ “ “ “ without Gold-Trap | 47.00 |

BOXING FREE.

**Attached, with Bracket Table.** As shown page 3.

| | |
|---|---|
| Fountain Spittoon complete, with Allan Table, Plain Sides | $73.50 |
| “ “ “ “ “ “ Glass “ | 75.50 |
| “ “ “ Imitation Rosewood Table | 69.50 |
| “ “ “ Holmes Table | 91.50 |

BOXING FREE.

**Adjustable.** As shown page 1.

| | |
|---|---|
| Fountain Spittoon complete, with Double Faucet and Saliva Ejector, | $60.00 |
| “ “ “ “ “ without Saliva Ejector, | 55.00 |
| “ “ “ with Single Faucet “ “ “ | 50.00 |

BOXING FREE.

Full directions for setting up and regulating the Fountain Spittoon accompany each Attachment sold.

## Water-Pressure in Fountain Spittoons.

For supply and waste-pipes we use the best silk-covered cloth-lined rubber tubing.

Every Fountain Spittoon we manufacture—Attached or Adjustable—is tested under a water pressure of 80 pounds per square inch, so that we are sure the tubing and every joint in the apparatus is abundantly able to stand a constant water pressure of 60 pounds.

With a water pressure greater than 30 lbs. it would be well, after the attachments are made, to open the balloon jet in the center of the spittoon bowl before turning on the water. Then open the water-valve at the base gradually, to determine the exact pressure necessary to produce the proper flow from the jets. If not so regulated, the excessive pressure on the balloon jet will cause a spattering of the water over the edge of the bowl.

**☞ Always shut off the water at the base before leaving the office at night.**

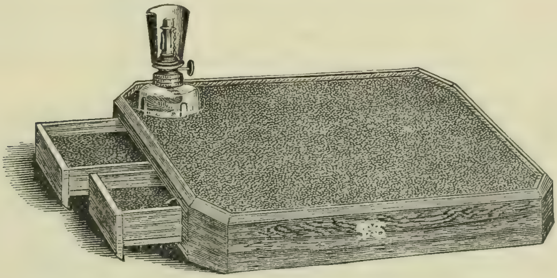
# BRACKET TABLES.

## TABLE FOR No. 2 BRACKET.

This Table is twelve inches square, covered with leatherette. The edges are raised about a quarter of an inch, to prevent instruments from rolling off when it is moved. It is put together in the strongest manner, and it is so firmly braced that it is impossible for it to warp.

Price, with Socket for No. 2 Bracket........................$3.00

## Imitation Rosewood Bracket Table.



This Table measures 12 x 12 inches, and contains two drawers, each 11¼ inches long by 4½ inches wide, for holding instruments, foils, etc.

The top is covered with fine cloth and edged with silk cord.

The drawers open only at the lamp side. The lamp has a metal holder which clamps it firmly so that it cannot be thrown from the table by an ordinary accident.

Price, including Lamp and Shield..........................$6.00

### LINEN COVERS.

| | | |
|---|---|---|
| For Imitation Rosewood Tables........................ | each | $0.90 |
| " Allan Tables .................................... | " | 1.10 |
| " Holmes Tables .................................. | " | 1.20 |

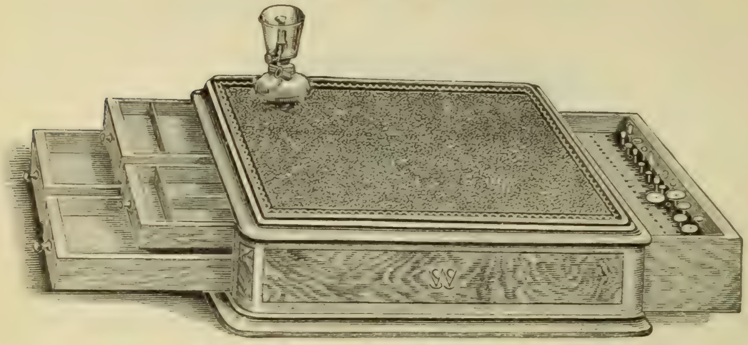
# TABLE PADS.

You can preserve the cover of your Table, keep it fresh looking and free from stains, by using a Table Pad. Made of Paper Fiber Lint, with "pinked" edges. They are neat and useful, and really ornamental.

| | | |
|---|---|---|
| Price, Pads for Allan Table............................ | each | $0.10 |
| " " " " " ......................... | per doz. | 1.00 |
| " " " Holmes Table........................... | each | .12 |
| " " " " " ...................... | per doz. | 1.20 |

# THE ALLAN BRACKET TABLE.

## Wood-Paneled.



Made in Walnut or Oak.

This handsome and convenient Table is 13½ inches square by 3½ inches deep, and contains five drawers, one of which is 4 inches long, 12 inches wide, and 2½ inches deep, containing 131 holes for engine-burs, disks, etc.

The other four drawers are each 8 inches long, 5 inches wide, and 1 inch deep. The two upper ones are lined with cloth and have movable sides by which to divide the spaces required for the different filling-materials. The lower drawers are without lining or slides.

The lamp is clamped firmly to the table by a metal holder, providing against its being upset by ordinary accidents.

Look for the Trade-Mark.

Price, including Lamp and Shield........................$10.00

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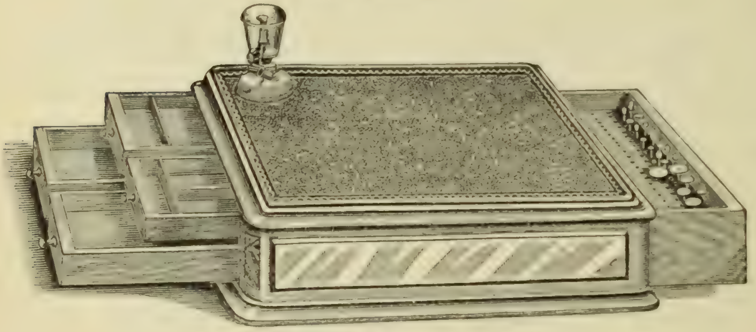
# THE ALLAN BRACKET TABLE.

## Glass-Paneled.



Made in Walnut or Oak.

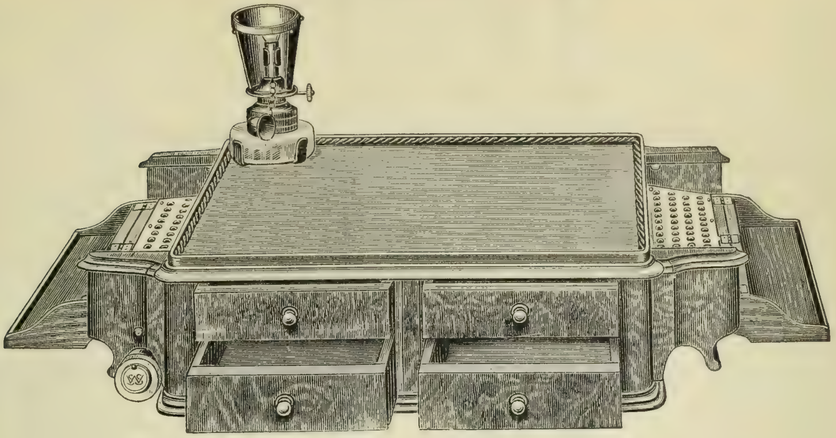
Precisely like the regular Allan, except that the panels are of heavy French plate-glass, instead of wood.

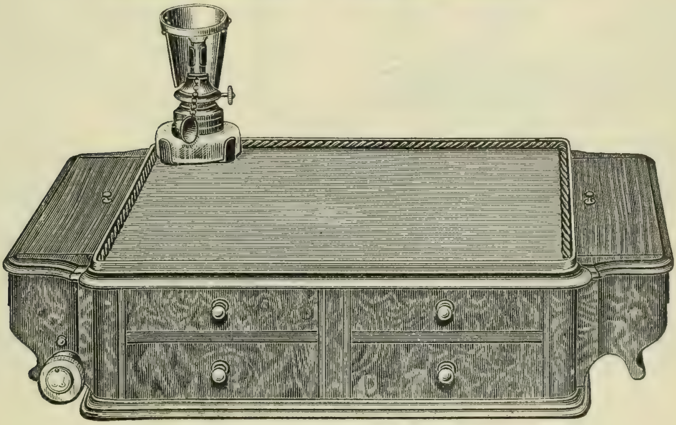
Price, including Lamp and Shield........................$12.00

**In ordering an Allan Table, either Wood or Glass Panel, specify whether wanted in walnut or oak. Unless the order so specifies, we send the Walnut Table.**

# THE HOLMES BRACKET TABLE.

## MADE IN WALNUT OR OAK.





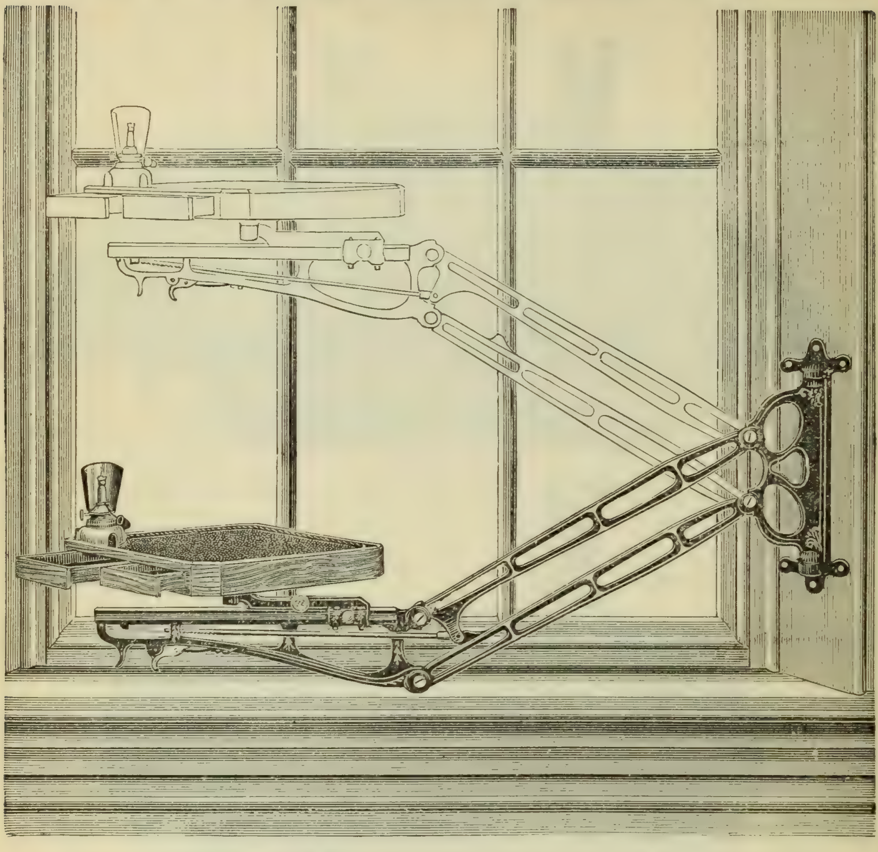
(Closed.)

The Holmes Bracket Table is the handsomest ever offered to the profession, as well as one of the most convenient. Fashioned somewhat after the pattern of the Allan Table, it differs widely in its appointments. The outside measurements are—length 17¾ inches, width to face of knobs 15⅝ inches, depth 4¼ inches. The four drawers are made the entire length of the Table, and can be opened from either end. The wings on either side contain nickel-plated racks for holding engine-bits, disks, right-angle burs, etc. The holes for the disks are drilled entirely through, so that the disks lie flat upon the surface and can be raised from the underpart. These racks are underlaid with leather, which if slightly oiled will keep the bits clean and bright. Beneath one of the wings is a nickel-plated cotton-holder containing a spring which pushes the cotton forward and keeps it constantly ready for use. It is made in the best manner throughout, and finished beautifully. Made in Walnut or Oak. Walnut sent unless Oak is specified.

Price, including Lamp and Shield..........................$28.00

Look for the Trade-Mark.

# THE S. S. WHITE TOOL-BRACKET No. 1.



In this Bracket the tray has a horizontal adjustment of 15 inches, which, with the reach of the pivoted arms, permits it to be swung 45 inches from the wall. The cut shows the highest and lowest relative positions. It is raised by lifting to the desired height, an automatic lock holding it wherever placed. To lower it, grasp the handle near the end of the carrier-frame, and compress the trigger with the finger, when the table sinks to the required level; releasing the trigger locks it. Both movements are simple and require but one hand. The tray shown is the ordinary imitation rosewood table.

PRICES.

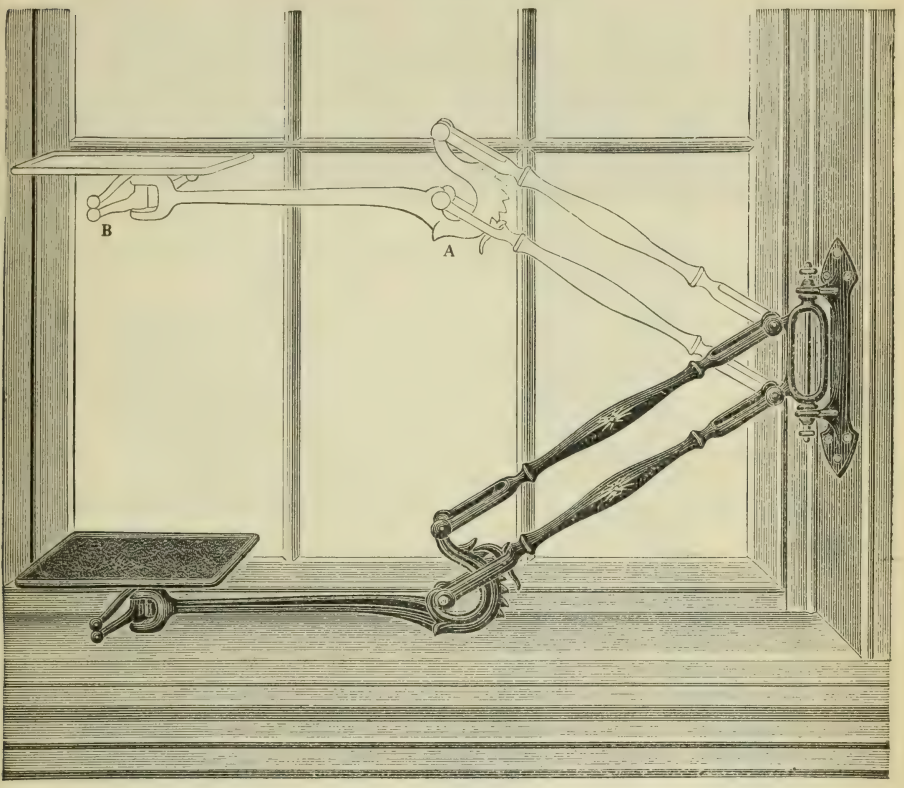
| | |
|---|---|
| S. S. White Tool-Bracket No. 1, Japanned, without Table... | $10.00 |
| The same, with Imitation Rosewood Table, Lamp, and Shield, as shown........................................ | 16.00 |
| Bracket No. 1, with plain Allan Table, Lamp, and Shield.... | 20.00 |
| " " " Glass-Side Allan Table, with Lamp and Shield................................ | 22.00 |
| " " " Holmes Table, with Lamp and Shield... | 38.00 |
| Boxing ............................................ | .50 |

See page 6 for illustrations of Allan Table.
" " 7 " " " Holmes Table.

# THE S. S. WHITE TOOL BRACKET No. 2.

## WITH TABLE.

Patented September 18, 1894.



This Bracket and Table combines simplicity of construction and convenience in the highest degree. The cut shows the arrangement of its parts so clearly that but little description is needed. When fully extended it reaches 52 inches from the place of attachment. The variation in the height of the Table is 23 inches. By the adaptation of the parallel bars B, the horizontal extension may be shortened 15 inches. For this movement a slight push on the edge of the Table is all that is required.

When the arms B are in position at right angles with the Bracket, the Table may be made immovable by pressing the arms on both sides in the same direction, either forward or backward. To raise the Table, lift the Bracket, and the ratchet and trigger, A, acting automatically, will hold it at any desired height. The Bracket is japanned and ornamented in bronze.

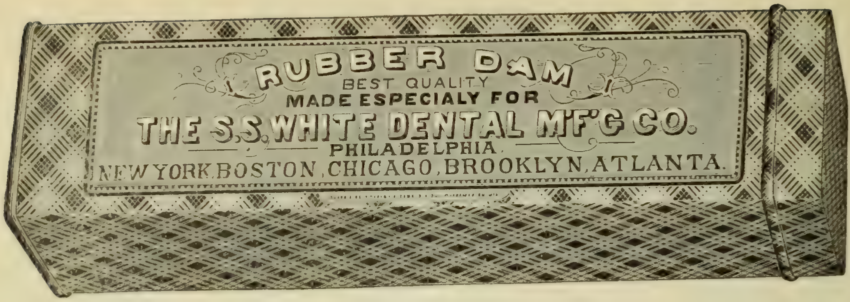
The Table is made specially for this Bracket. A plain tray, 12 inches square, covered with leatherette, raised rim, no drawers. Won't warp.

We do not hesitate to say that this is in every way the best and most convenient Bracket and Table ever offered at the price.

Price, complete as illustrated..............................$10.00

Boxing, 50 cents.

# RUBBER-DAM.


RUBBER DAM
BEST QUALITY
MADE ESPECIALY FOR
THE S.S.WHITE DENTAL MF'G CO.
PHILADELPHIA.
NEW YORK.BOSTON.CHICAGO.BROOKLYN.ATLANTA.

**The Rubber-Dam we sell is made expressly to our order, and not a roll is accepted until by sufficient tests it is proved to be all right.**

We sell Rubber-Dam in three forms,—in the sheet and in 5-in. and 7-in. rolls. Our sheet Dam is 35 inches wide. A yard of it contains 1260 square inches; a half-yard 630 square inches. Our roll Dams are sold on the same basis. The 5-in. yard roll is 21 feet long, the 7-in. yard roll 15 feet; half-yards half length. In either form of our Rubber-Dam you will get a quality that is unequaled elsewhere: strong and durable, and does not tear on being stretched over the teeth if properly punched.

Our roll Dams are put up in square enameled metal cases, yard and half-yard.

PRICES.

| | | | | | |
|---|---|---|---|---|---|
| Thin, Sheet or Roll | per | | yard | $1.25 |
| " " " | " | ½ | " | .63 |
| Medium " " | " | | " | 1.75 |
| " " " | " | ½ | " | .88 |
| Thick " " | " | | " | 2.50 |
| " " " | " | ½ | " | 1.25 |

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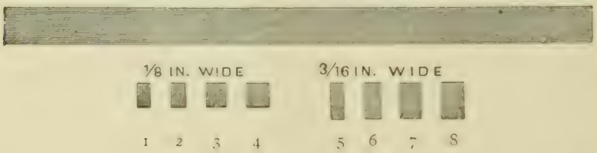
## Rubber Strips for Separating Teeth.



These Strips are largely used, and are much preferred to any other forms. Made in two widths and of four thicknesses. Nos. 1, 2, 3, 4, are ⅛ in. wide; Nos. 5, 6, 7, 8, are 3-16 in. wide. Length of Strips 3 in.

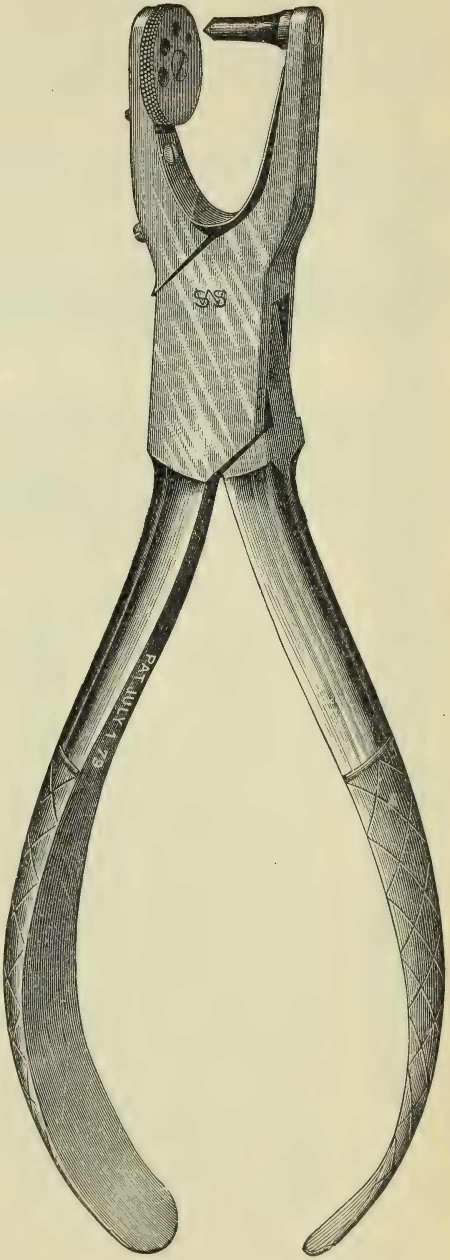
Boxes containing 50 Strips, *assorted* sizes.

Price........................................per box $0.25

We can also supply them in boxes of any designated numbers. The box will contain the full quantity, though if all are ordered of the larger sizes, say No. 7 or 8, it will not hold 50 Strips. On the other hand, a selection confined to the smaller sizes increases the number of Strips to the box.

Price........................................per box $0.25

# AINSWORTH'S
# IMPROVED RUBBER-DAM PUNCH.



There are two principal reasons for its popularity. First, the principle of construction is simple and correct. Second, we have made it in a manner to give effectiveness to that principle. It met a want, filled it completely, and nothing has yet been devised to supplant or even approach it in point of usefulness.

Four sizes of holes—ample for any variation in the sizes of the teeth—are provided for, and are cut by a solid coned punch against a perforated die. The perforations are thus made clean and sharp, reducing to the minimum the risk of tearing the dam during its adjustment. Both punch and die are made of hardened steel, thus affording durability in addition to the highest utility.

Made and finished in our standard style.

PRICE.

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## Notes on Operative Dentistry.

**By MARSHALL H. WEBB, D.D.S.**

Cloth, 8vo, pp. 175, Illustrated.

It used to be said that no dental student ever went out from Dr. Webb's office who was not a skillful operator. By common consent one of the foremost exemplars of artistic operative dentistry of his day and generation, Dr. Webb had the faculty of imparting to those whom he taught his own enthusiasm for beautiful work and not a little of his art. This little volume was his last contribution to the profession, a description of the methods by which he had attained success. It cannot fail to improve the manipulative ability of those who study its pages.

Price............$2.25 net.

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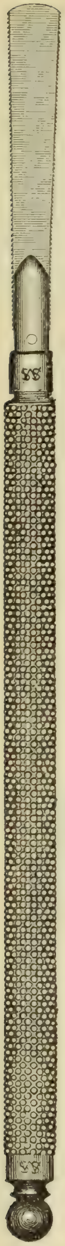

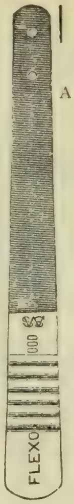

Suggested by Dr. W. B. Fahnestock.

The perforations in the end of the file at A adapt it for insertion in the Gordon White Holder.

The unserrated part of the file is cut off and the instrument is ready for use as shown in the illustration.

Only Flexo Files Nos. 000, 00, 1, and 2 are perforated, and these become draw-cut when used in the chuck-holder.

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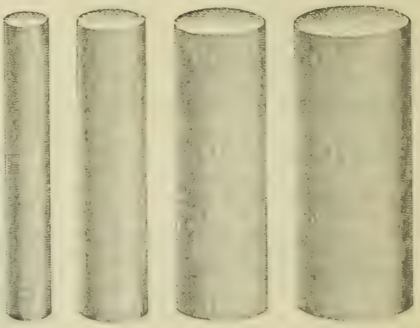
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1½ Inch Rolls.

The absorbing capacity of this dainty preparation equals that of the well-known loose Absorbent Cotton. It can be used wherever the latter can be. Thus, two 1½ inch rolls can be laid over the mouths of the ducts of Steno; a 6 inch roll can be placed under the tongue with the ends tucked down beside it, or it can be put outside the lower teeth next to the lip and cheeks. In this last position the roll is also useful as a cushion to guard against painful pressure on the lower lip in some operations on the upper teeth. Whether used whole or cut in pieces, the edges of the rolls are smooth and homogeneous, with no “fuzzy” fibers protruding.

This form of Absorbent Cotton will be especially appreciated in crown- and bridge-operations; and it will also advantageously replace napkins in examinations and in that large and varied class of brief operations where it seems hardly worth while to apply the dam and clamp. The Absorbent Cotton Rolls are made in two lengths, 1½ and 6 inches long, and of four diameters, about ⅝-in., ½-in., ⅜-in., and ¼-in.

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| Box of 100 6-in. Rolls, assorted diameters......... | $0.50 |
| “ “ 1½-in. “ “ “ ......... | .25 |

# KÉLÈNE (Ethyl Chlorid).

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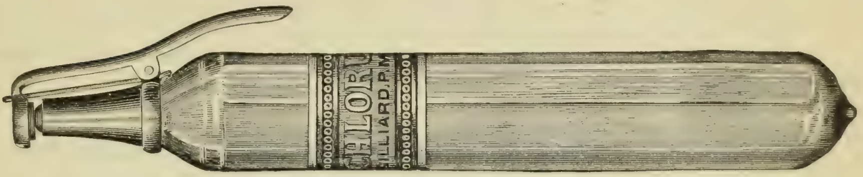
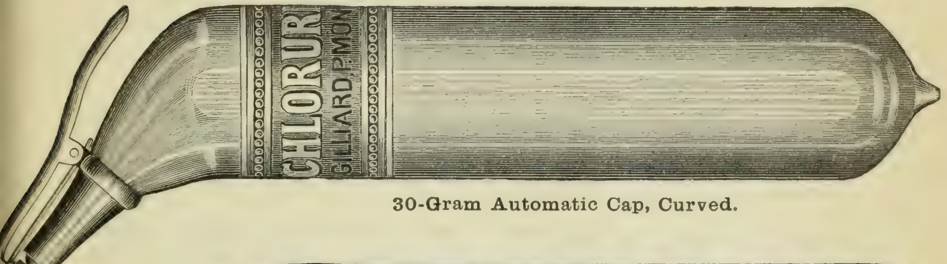
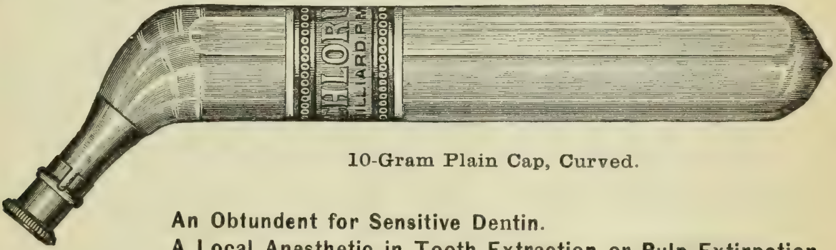


10-Gram Automatic Cap, Straight.



30-Gram Automatic Cap, Curved.



10-Gram Plain Cap, Curved.

**An Obtundent for Sensitive Dentin.**
**A Local Anesthetic in Tooth-Extraction or Pulp-Extirpation.**
**A Reliever of Neuralgia.**
**A Diagnostic between Peripheral and Centric Neuralgias.**

For the extraction of teeth, the liquid should be projected directly on the surface of the gum, as near to the apex of the root as possible, but care should be taken to protect the crown of the tooth on account of the painful action of cold on this part. The gum should be first dried, the crown and neck of the tooth protected by a small napkin or the Coffer-Dam Shields, and the Chlorid of Ethyl then applied until the gum is bleached. Anesthesia is then complete. It is particularly to be observed that the tube is not to be held too close to the spot to be anesthetized; better results will be secured at a little distance. The patient should breathe through the nose, otherwise general anesthesia might result.

We supply "Kélène" in straight and curved tubes with the well-known Plain Slip Cap, two sizes, 10-gram and 30-gram; with Automatic Caps, three sizes, 10-gram, 30-gram, and 60-gram. In ordering designate as straight or curved, Plain or Automatic Cap, and give the size: 10-gram is small; 30-gram is large; 60-gram (in Automatic Cap only) is extra large.

PRICES.

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| Large Tubes, 30-gram, Plain Cap, Straight or Curved...........each | $1.00 |
| Small " 10- " " " " " ........... " | .45 |
| " " 10- " " " in lots of 10 Tubes.......per tube | .40 |
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# PYROZONE ($H_2O_2$).

The main reason for the constantly growing popularity of the pyrozone preparations is that they are $H_2O_2$ all the time. The dentist who takes one of these preparations for his hydrogen peroxid is sure that he has always hydrogen peroxid. They are absolutely stable solutions of that drug. Two forms.

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Wherever a cleansing mouth-wash is required, as in abscess and pyorrhea, Medicinal Pyrozone is the indication. As an antiseptic in all infectious conditions of the oral mucous membrane it produces remarkable results. No risk of toxic effects. Put up in 4-oz. glass-stoppered bottles.

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| Price, Medicinal Pyrozone.......................... | per bottle | $0.50 |
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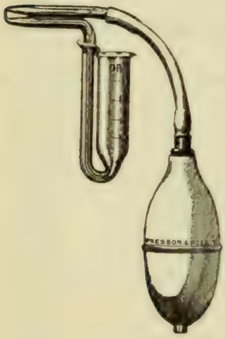
The sale of the 5 per cent. Ethereal Solution of Pyrozone has been discontinued. This solution can readily be prepared by diluting 1 part of 25 per cent. ethereal solution with 4 parts of pure sulfuric ether. The container must be clean and glass-stoppered.



Pamphlet describing pyrozone and detailing methods of use free on application.

The 3 per cent. solution can only be sent by express. The 25 per cent. solution can be mailed at an additional expense of 15 cents.

### Atomizer for Pyrozone.

An Atomizer, specially adapted for the exhibition of Pyrozone, is made in three forms: straight spray, up spray, and down spray.

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Disinfectant, Detergent,
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Antiseptic, Germicide.

## THE IDEAL ANTISEPTIC

For External and Internal Use.

NON-TOXIC, NON-IRRITANT.
ABSOLUTELY SAFE UNDER ALL CONDITIONS.
ALWAYS READY FOR INDICATED USE.

Invaluable to the dentist in exploration and operation. Indispensable in the treatment of diseases of the gums, mouth, and throat. An especially important application of Boro-Bornyl is its gently astringent influence after extraction or operation of any character.

Superior in every way to Carbolic Acid, Phenylic compounds, Corrosive Chlorid of Mercury, Permanganate Potash, and many of the ill-smelling chemical synthetics so widely exploited. Peculiarly advantageous to the dentist whose patients are fastidious and exacting as to flavor of antiseptic used; because of its absolute safety under all circumstances and its distinctively agreeable flavor and odor, it can be used *ad libitum.*

Lowest in price of all reliable antiseptics on the market.

The qualitative formula of Boro-Bornyl is Cinnamic Aldehyde, Gaultheria (synthetic,—*i.e.*, Free Methyl Salicylate), Eucalyptol, Menthol in combination with Boro-Benzoic Acid, Sodic Biborate, Sulphate Alumina, Formate of Bornyl, and Aceto-Bornyl.

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Many dentists know the efficacy of the sodium and potassium treatment for putrescent root-canals; the promptness with which the preparation goes to work on the canal contents, and thus right on the spot makes a soap which so cleanses and purifies the canal that it can be filled safely without further treatment.

The new form, hermetically sealed glass tubes, in which the preparation is now supplied, will be welcomed, as it materially increases the facilities for manipulation.

Price............................per box containing 6 tubes $1.00

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## HOLLINGSWORTH'S SYSTEM

FOR

# Crown- and Bridge-Work.

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**Patented December 13, 1892; July 24, 1894.**

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### Simplicity of Method, Perfection of Results,

and adaptability to every class of crown- and bridge-work are characteristics of this system.

Following the plain directions, the dentist will find no difficulty in arriving at accurate and artistic results. By the Hollingsworth System the following operations are performed with greater ease than by any other method:

**Gold Crowns for Molars and Bicuspids.**
**Gold Crowns for Incisors and Cuspids.**
**Solid Gold Cusps.**
**Porcelain Facings.**
**Facings for All-Gold Bridges.**

The cuts on pages 17, 18, and 19 show the folding cases containing cusp and crown forms as put up for sale. Figures A to F show the simple special appliances required.

Directions for every detail of the process accompany each set.

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| Price, Set No. 1 | $18.00 |
| " " " 2 | 13.00 |
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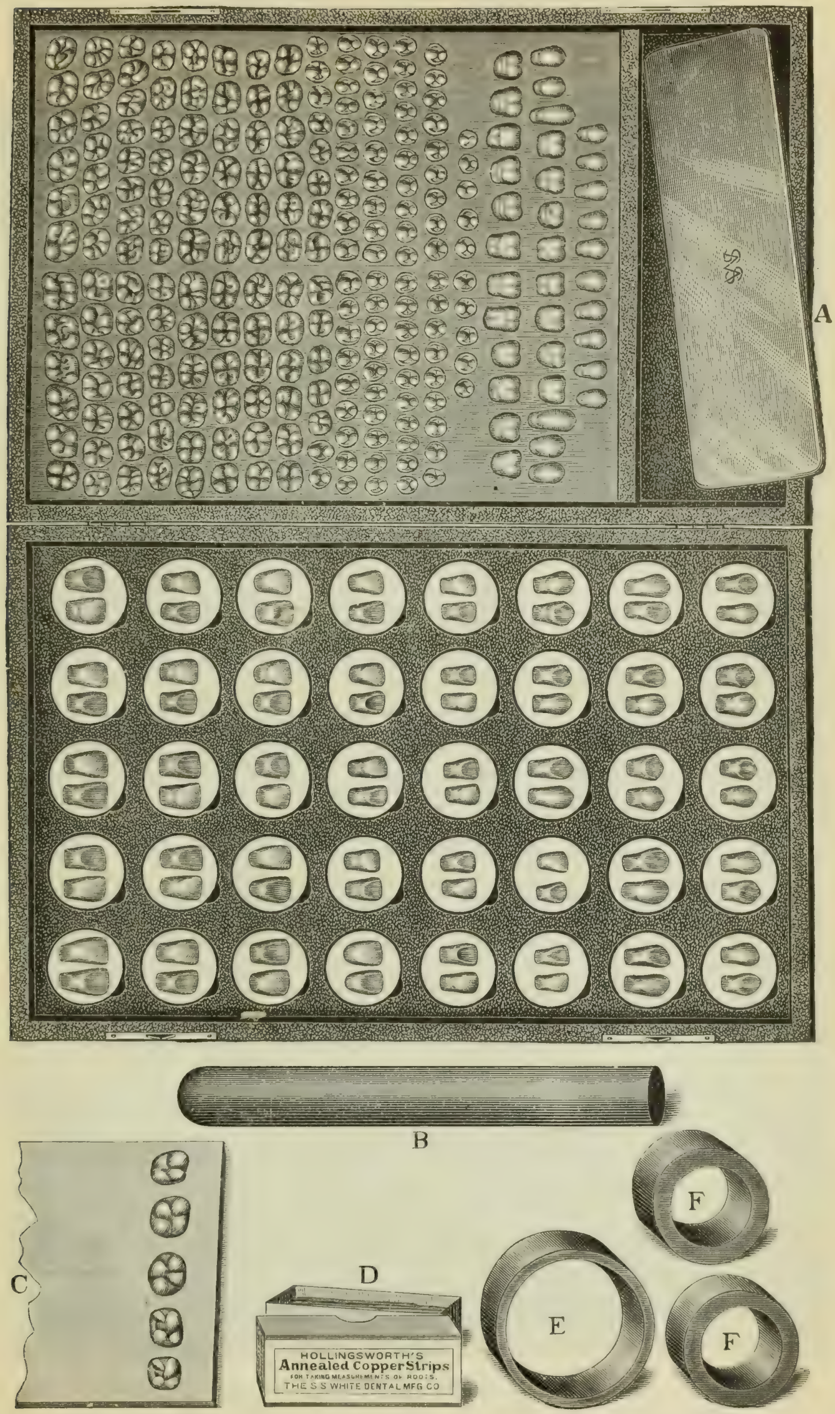
### Send for our Crown- and Bridge-Work Pamphlet (FREE),

which contains much valuable information in the various methods of crowning teeth.

# Appliances for Hollingsworth's Crown- and Bridge-Work System, Set No. 1.


A
B
C
D
HOLLINGSWORTH'S
Annealed Copper Strips
FOR TAKING MEASUREMENTS OF ROOTS.
THE S S WHITE DENTAL MFG CO
E
F
F

Price of Set No. 1 .................................... $18.00

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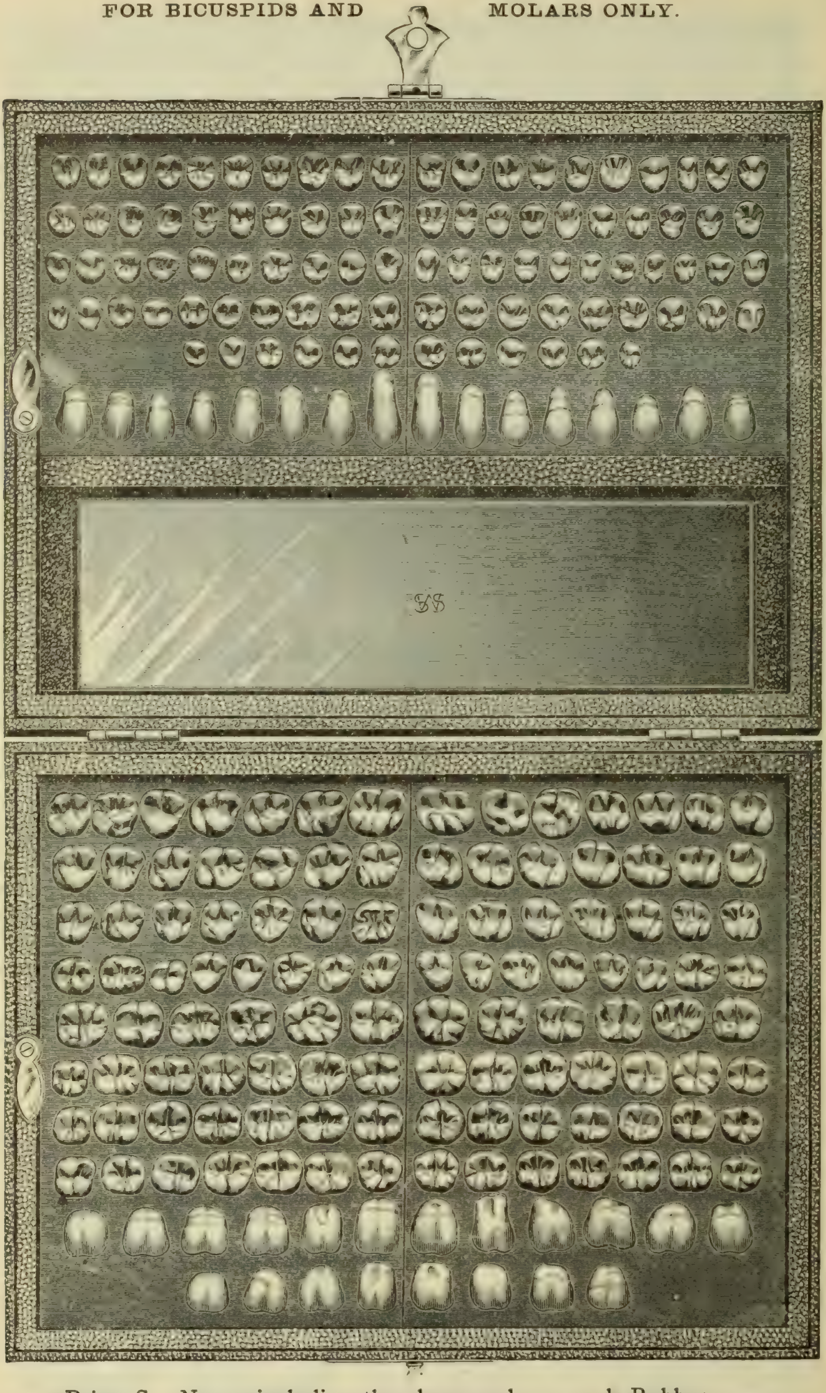

Price, Set No. 2, including the above and one each Rubber Rings, one Carbon Rod, one Asbestos Pad, one box Copper Strips........................................$13.00

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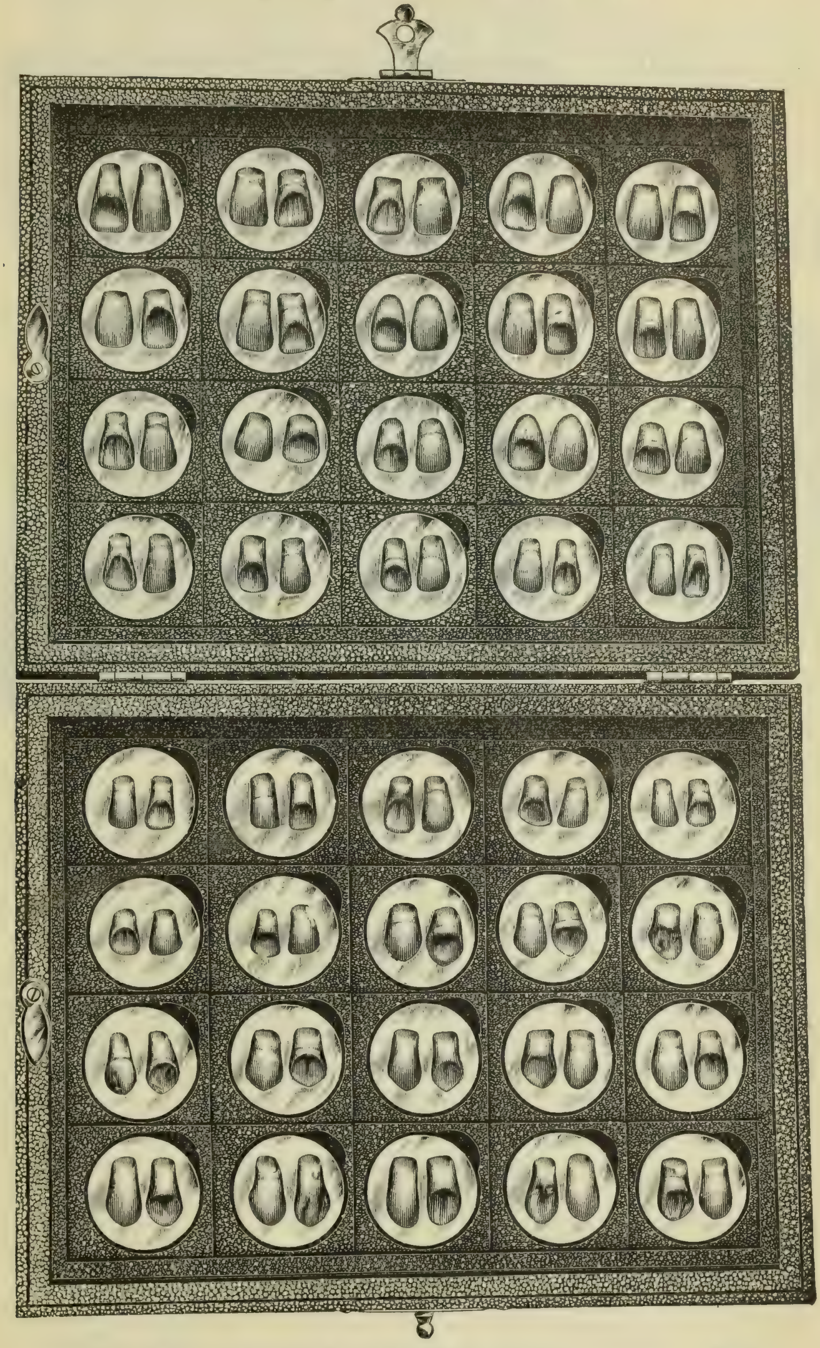

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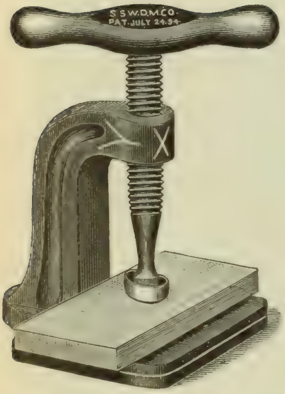
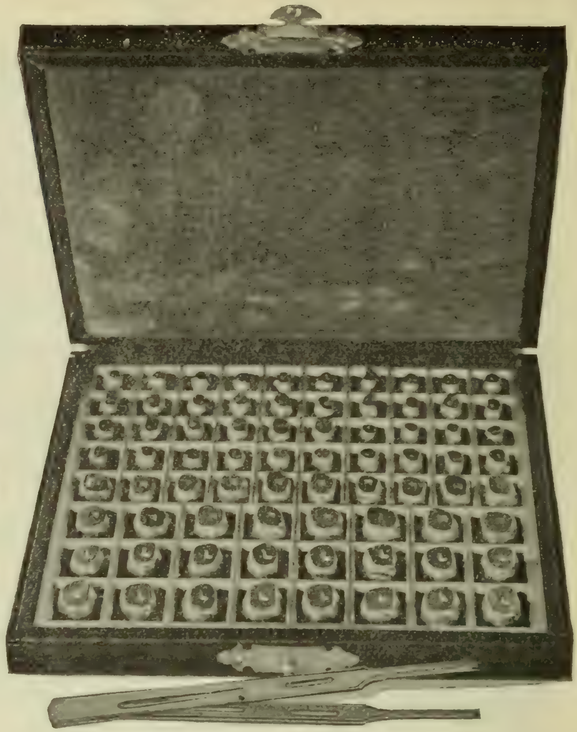
# HOLLINGSWORTH'S CONTOURING SYSTEM.

Patented July 24, 1894.





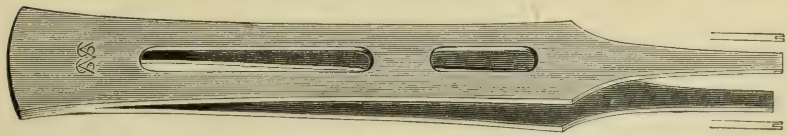
This method of contouring gold crowns unerringly gives the body of the crown a correct natural shape corresponding with the other teeth in the mouth. It consists in forcing the crown to a selected form copied from nature. To meet the needs of practice, 74 of these forms are provided for bicuspids and molars. They are of metal, nickel-plated, and comprise the body of the tooth-crown; that is, the section between the neck and the point where the crown begins to round off into the cusps. The contouring is done after the band is fitted to the root, but before the cusp cap is soldered on. The band is held in a block of wood so as to prevent interference with the shape of the fitted neck, and the selected form is forced into it with a small screw-press. The result is an artistically contoured crown every time.

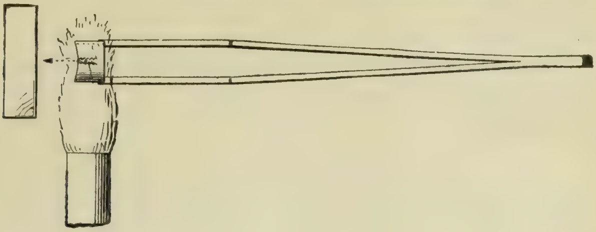
The method can be utilized in almost any system of gold crown construction.

The set consists of 74 Contouring Forms in Folding Case, 1 Pair Pliers, 1 Screw-Press, 5 Hard-wood Blocks.

Price, complete........................................$9.00

# THE HOLLINGSWORTH BAND PLIERS.





One of those handy little contrivances whose use will be apparent to all crown- and bridge-workers. They are especially designed for use with the Hollingsworth Contouring System to enable the operator to quickly form a matrix for the band.

The small cut shows the application of these Pliers in holding the band while soldering. The slots in the points hold the band or crown without danger of slipping.

Price .......................................... $0.25

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HOLLINGSWORTH'S
**Annealed Copper Strips**
FOR TAKING MEASUREMENTS OF ROOTS.
THE S. S. WHITE DENTAL MFG. CO.

These Strips are made from carefully annealed copper, and are so flexible that they are easily adapted to the contour of the root, and thus afford a perfect measurement. Put up in boxes containing 100 Strips, each 2¼ inches long.

Price.......................................per box $0.12

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# Nitrous Oxide.

## Its Properties, Methods of Administration, and Effects.

By S. H. GUILFORD, A.M., D.D.S.,

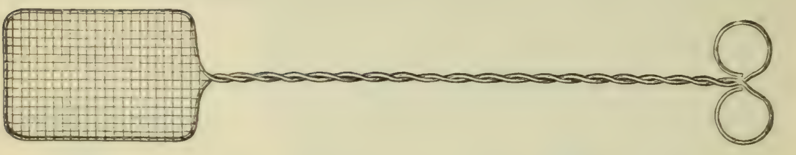
Professor of Operative and Prosthetic Dentistry, Philadelphia Dental College.

Every user of nitrous oxid owes it to himself, more so to his patients, to know all there is to be learned upon the methods of administration, cases where the gas should not be given, etc. The kind of information which Dr. Guilford gives within the covers of this little book is that which is specially useful.

Price, Cloth..........................................$1.00

# WIRE SOLDERING FRAME No. 1.

Devised by Dr. C. L. Alexander.



For soldering gold crowns or small bridge pieces. The flame passes through the meshes of the wire readily, so that all parts of the piece can be heated evenly. Crowns are thus soldered without changing. Small bridge pieces can be held over the flame for heating up as well as soldering.

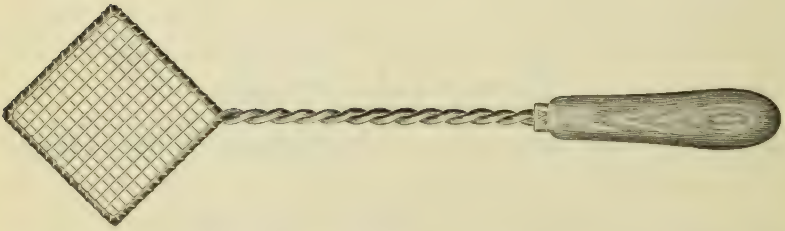
The handle is eight inches long, so that there is no inconvenience from the conduction of the heat to the hand while manipulating the frame.

Price, Wire Soldering Frame........................each $0.15

# WIRE SOLDERING FRAME No. 2.

## FOR CROWN- AND BRIDGE-WORK.

Suggested by Dr. D. T. Pepper.



This Frame is suitable for holding the largest pieces of crown- and bridge-work. The whole instrument is 16 inches long, the net frame is 3½ inches square.

The wood handle protects the hand under any degree of heat that may be required in soldering.

Price..............................................each $0.50

# TEETH FOR PARTIAL DENTURES.

Full sets of artificial teeth are not required for all patients. There are many cases where only one or two or three or four teeth have been lost from the natural arch or so disabled by decay as to require substitution. These partial losses are found in different parts of the mouth. Sometimes the bicuspids and molars are lost first; again, it is the incisors. The cuspids appear, as a rule, to resist the destroying influences longer than the others.

Generally speaking, it may be said that in the lower jaw the molars are the first teeth to be lost, the incisors and cuspids last. In the upper jaw, the bicuspids are apt to be the first victims of decay, the cuspids last of all, with sometimes a straggling molar to bear them company.

So that it is not uncommon to find patients with the incisors and cuspids in good condition for a considerable time after their masticating teeth have yielded to the inevitable; and, on the other hand, other patients whose incisors have been lost,—more especially apt to occur in the upper jaw,—but with the posterior teeth in good, serviceable condition.

It is our business to provide porcelain teeth for every condition requiring substitution. We make what are called partial sets of gum teeth to suit all cases, single teeth, sets of two (both centrals); sets of three (both centrals and one lateral in one section); sets of four (both centrals and both laterals in one section, or in two sections); sets of four (bicuspids); sets of six (centrals, laterals, and cuspids for both sides in two or four sections); sets of six (one bicuspid and two molars for both sides, in two sections); sets of eight (bicuspids and molars in four sections); sets of ten (incisors, cuspid, and bicuspids for both sides, in four and six sections); sets of ten (cuspid, bicuspids, and molars for both sides, in four sections), and so on.

This month we show the sets of four incisors, in two sections. The great range of selection is indicated by running over the classification of forms, to a few examples of which special attention is directed.

*Short-Bite* Sections have the lingual surface much shorter than the labial. Of these, sixty examples are shown, covering a wide variation in proportion of width to length of crown, greater or less fullness of the labial face, thickness of gum, etc. Nos. 109, 110, 111, and 112 have the pins set in a recess, giving an extremely short bite without any shoulder. Nos. 173, 174, 175, and 176 have extremely short, thin gum.

In *Short, Broad* Sections the teeth are wide in proportion to their length, with very flat gum, see Nos. 177, 178, 179, and 180. Suited for the lymphatic temperament.

In *Long, Narrow* Sections the nervous temperament is provided for. Length predominates over breadth, and the cutting-edges are long.

*Irregular* Sections imitate some of the conditions frequently found in the bilious temperament. The laterals are rotated and inclined toward the centrals.

Sections with *Receding Gum* are designed for cases of protruding lower jaw. The labial face of the tooth is bow-shaped, with the gum receding in a strong curve.

*Irregular Lower* Sections are provided because a crowded condition among these teeth is quite common in natural dentures.

Our Catalogue of Porcelain Teeth of 200 pages shows the entire line of more than 2100 molds. Free to any dentist or dental student on application. Standard Shade Guide $1.50.

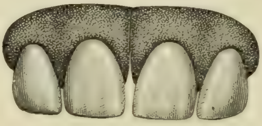
# CLASSIFICATION

OF THE

# TEETH FOR PARTIAL DENTURES.

Sets of 4, in Two Sections.

216



## SHORT-BITE SECTIONS.

Nos. 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 125, 126, 127, 128, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 209, 210, 211, 212, 213, 214, 215, 216, 237, 238, 239, 240.

## SHORT, BROAD SECTIONS.

Nos. 125, 126, 127, 128, 133, 134, 135, 136, 173, 174, 175, 176. 177, 178, 179, 180, 197, 198, 199, 200, 225, 226, 227, 228.

## LONG, NARROW SECTIONS.

Nos. 121, 122, 123, 124, 129, 130, 131, 132, 229, 230, 231, 232, 233, 234, 235, 236.

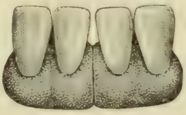
## IRREGULAR SECTIONS.

Nos. 237, 238, 239, 240.

## SECTIONS WITH RECEDING GUM.

Nos. 129, 130, 131, 132, 141, 142, 143, 144, 185, 186, 187, 188, 217, 218, 219, 220.

9



## LOWER.

## IRREGULAR SECTIONS.

Nos. 1, 2, 3, 4.

## SHORT, BROAD SECTIONS.

Nos. 9, 10, 11, 12.

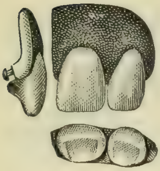
## LONG, NARROW SECTIONS.

Nos. 1, 2, 3, 4, 5, 6, 7, 8.

# CHART OF GUM SECTIONS, PARTIAL.

## Upper, Sets of 4, in Two Sections.

101



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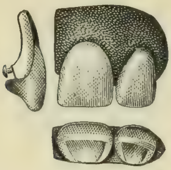

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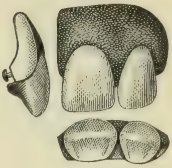

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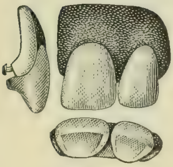

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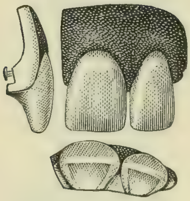

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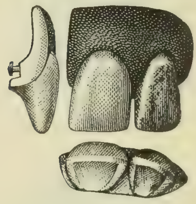
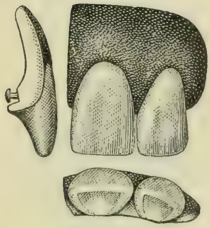


107



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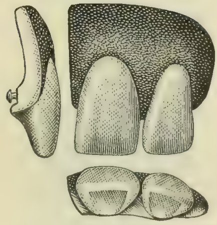

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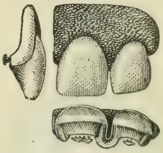

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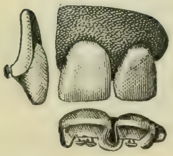

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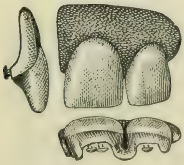

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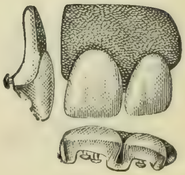
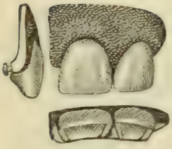


# CHART OF GUM SECTIONS, PARTIAL.

Upper, Sets of 4, in Two Sections.

113



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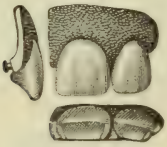

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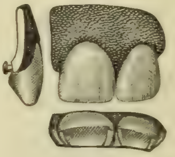

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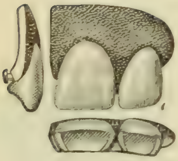

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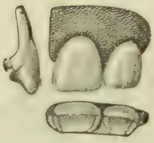

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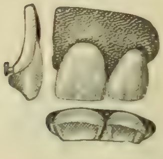

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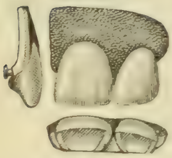

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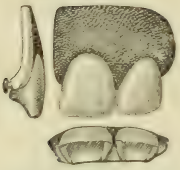

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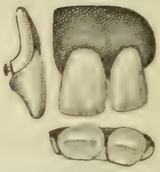

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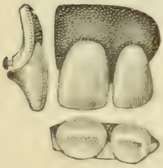

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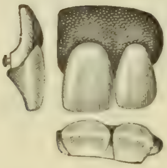

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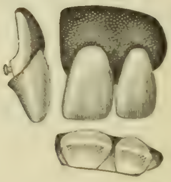

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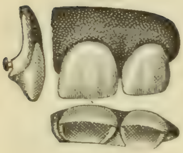

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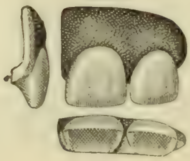

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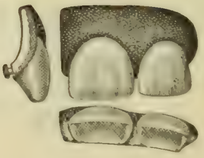
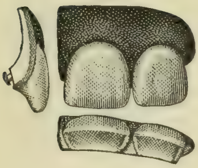


# CHART OF GUM SECTIONS, PARTIAL.

Upper, Sets of 4, in Two Sections.

128



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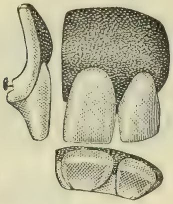

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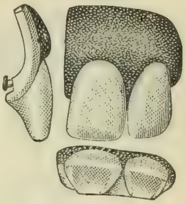

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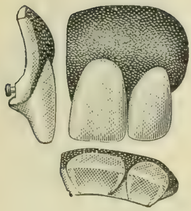

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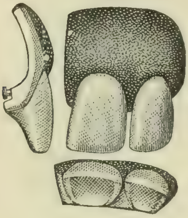

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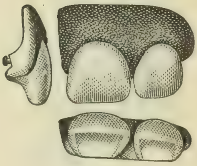

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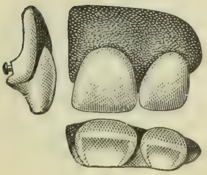

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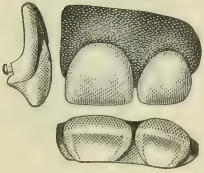

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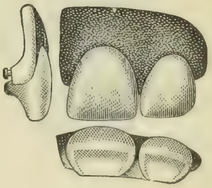

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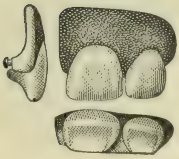

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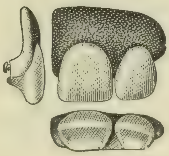

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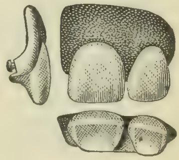

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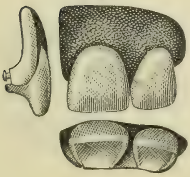

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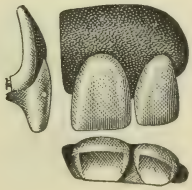

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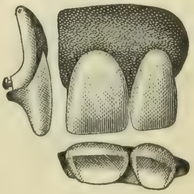
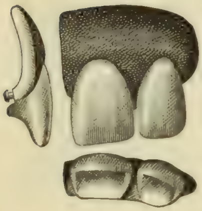


# CHART OF GUM SECTIONS, PARTIAL.

Upper, Sets of 4, in Two Sections.

143



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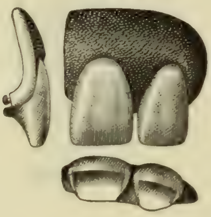

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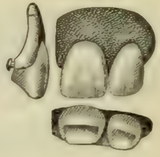

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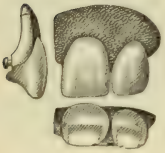

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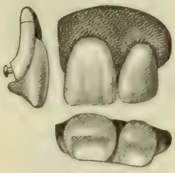

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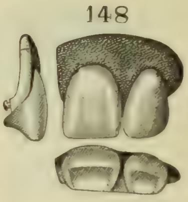

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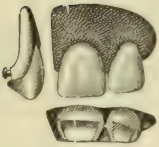

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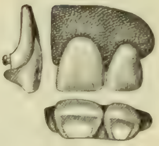

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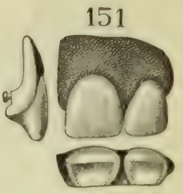

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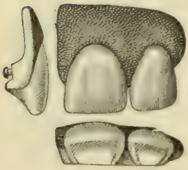

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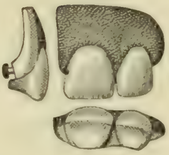

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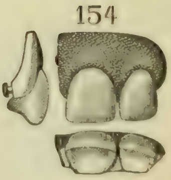

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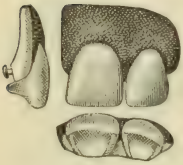

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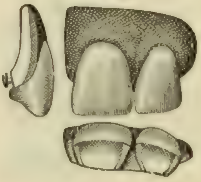

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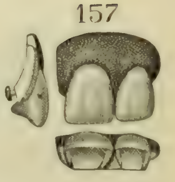
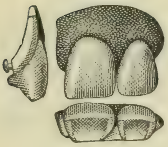


# CHART OF GUM SECTIONS, PARTIAL.

## Upper, Sets of 4, in Two Sections.

158



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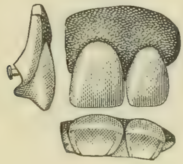

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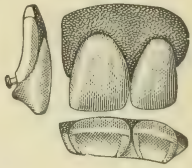

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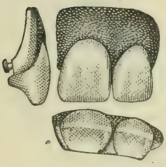

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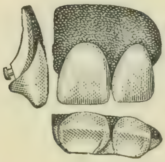

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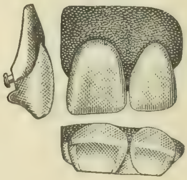

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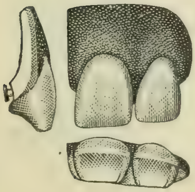

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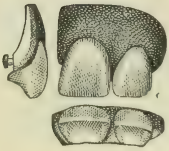

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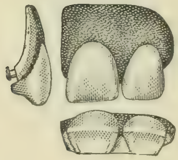

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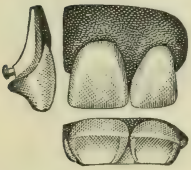

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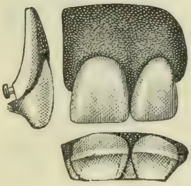

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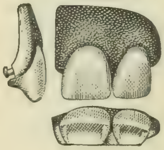

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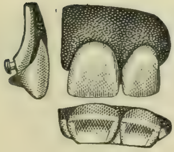

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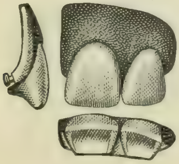

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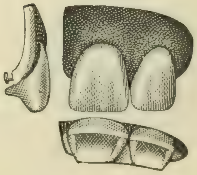
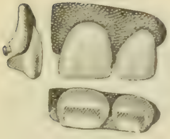


# CHART OF GUM SECTIONS, PARTIAL.

## Upper, Sets of 4, in Two Sections.

173



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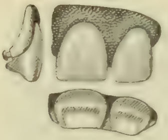

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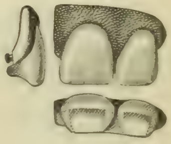

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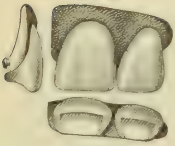

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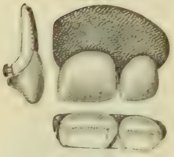

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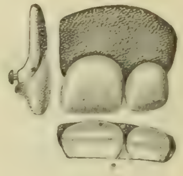

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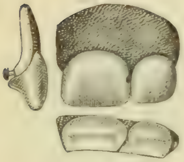

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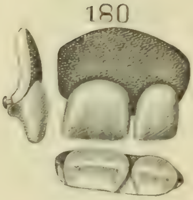

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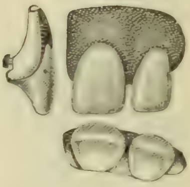

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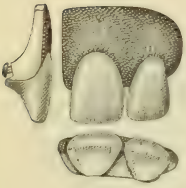

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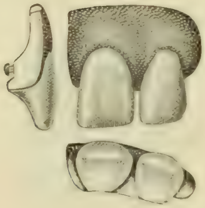

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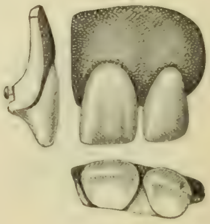

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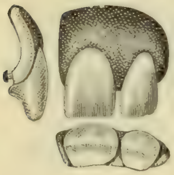

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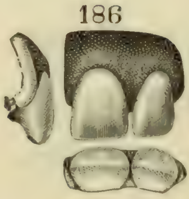

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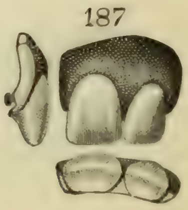
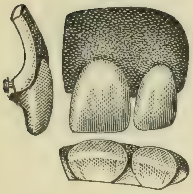


# CHART OF GUM SECTIONS, PARTIAL.

## Upper, Sets of 4, in Two Sections.

188



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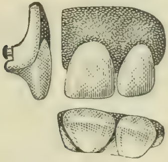

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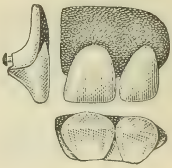

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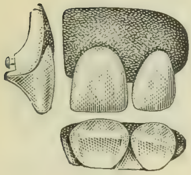

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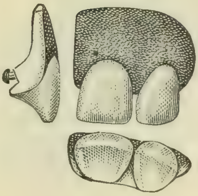

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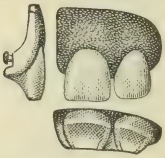

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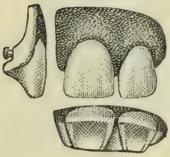

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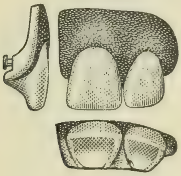

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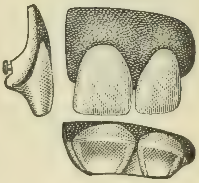

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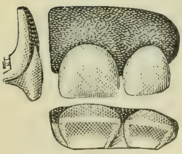

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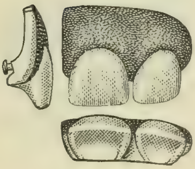

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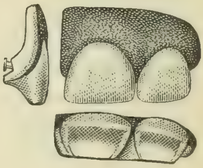

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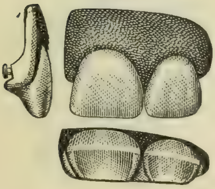

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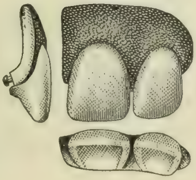

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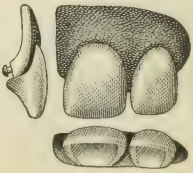
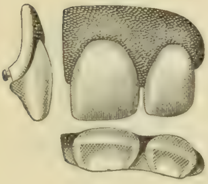


# CHART OF GUM SECTIONS, PARTIAL.

## Upper, Sets of 4, in Two Sections.

203



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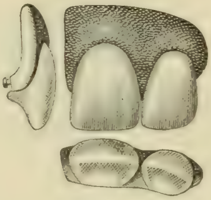

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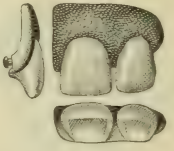

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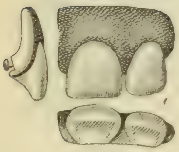

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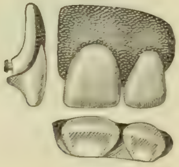

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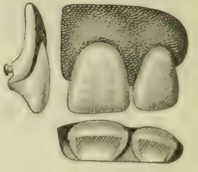

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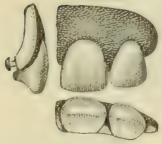

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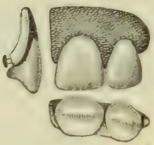

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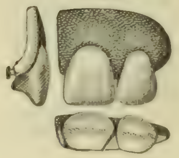

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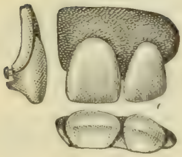

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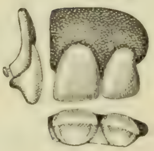

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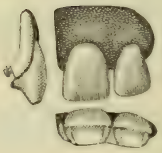

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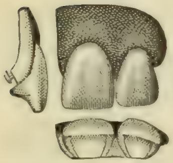

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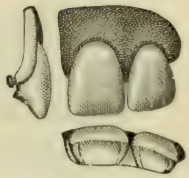

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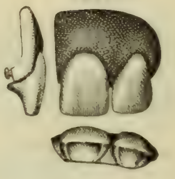
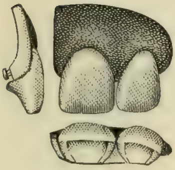


# CHART OF GUM SECTIONS, PARTIAL.

## Upper, Sets of 4, in Two Sections.

218



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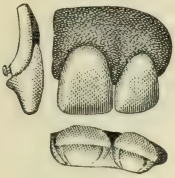

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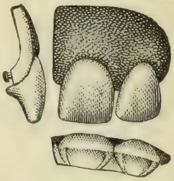

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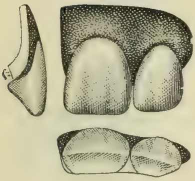

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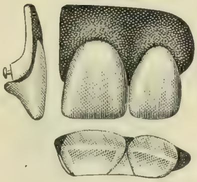

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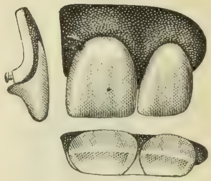

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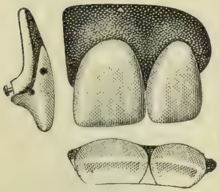

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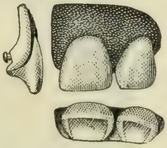

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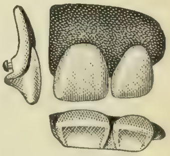

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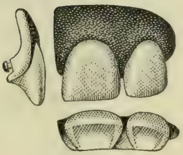

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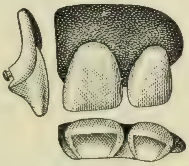

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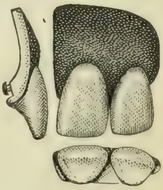

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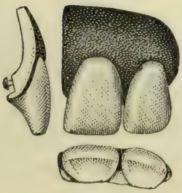

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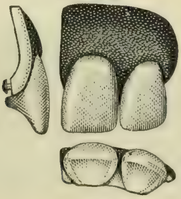

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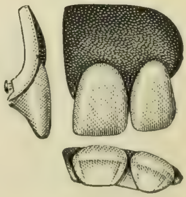

# CHARTS OF GUM SECTIONS, PARTIAL.

Upper, Sets of 4, in Two Sections.

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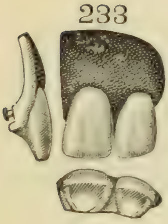

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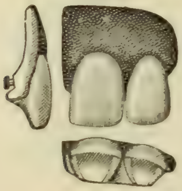

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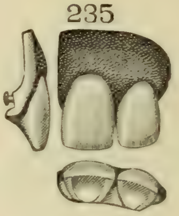

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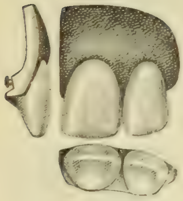

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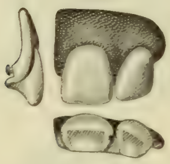

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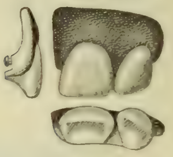

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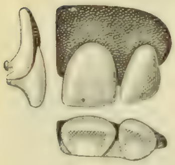

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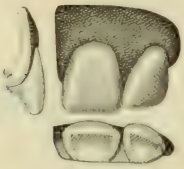

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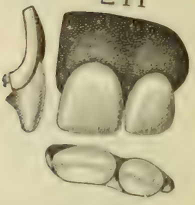

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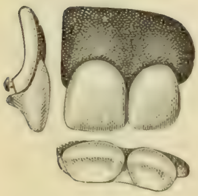

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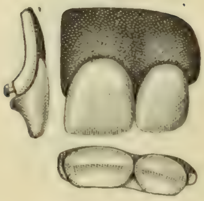

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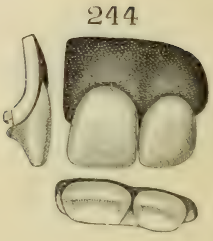

# CHART OF GUM SECTIONS, PARTIAL.

Lower, Sets of 4, in Two Sections.

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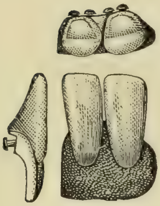

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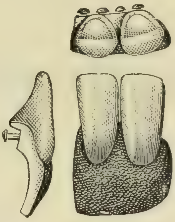

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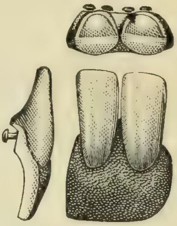

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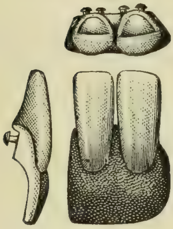

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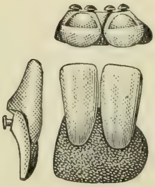

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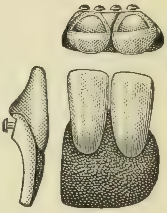

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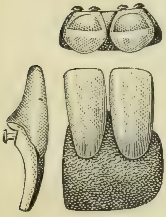

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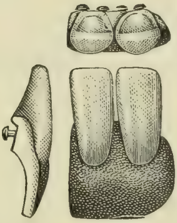

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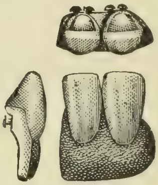

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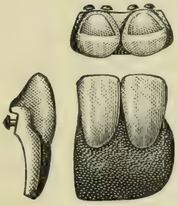

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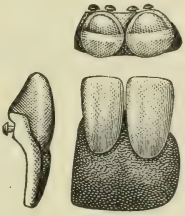

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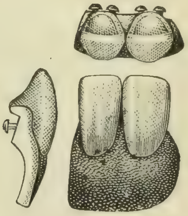

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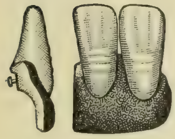

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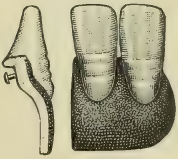

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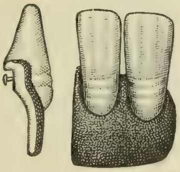

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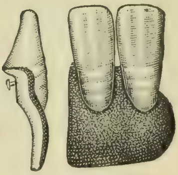

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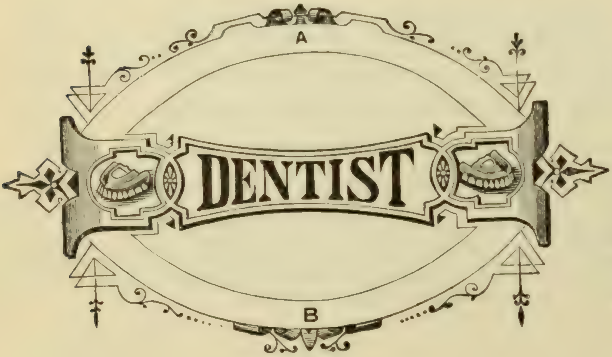

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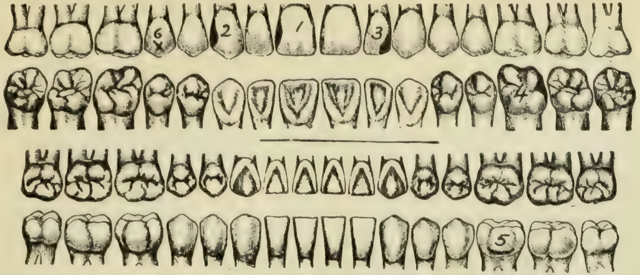

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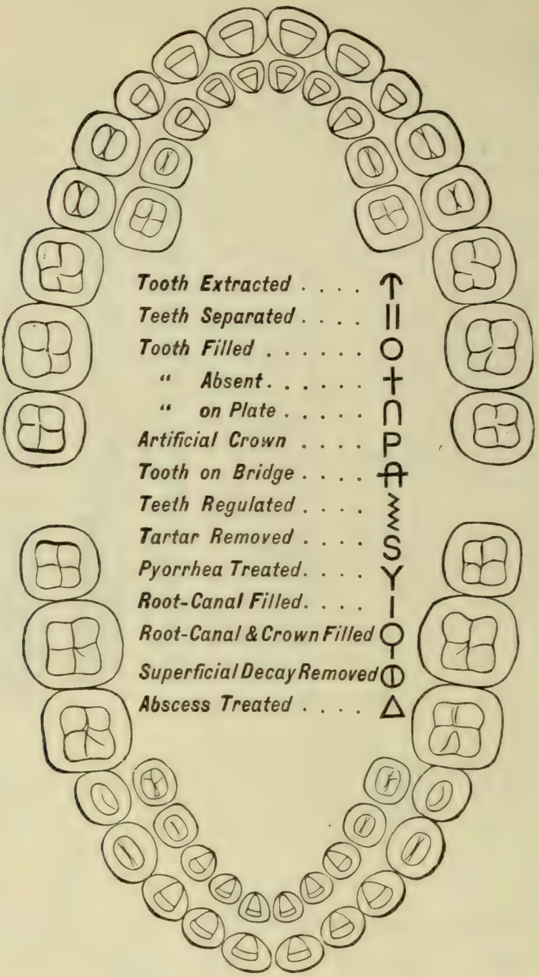
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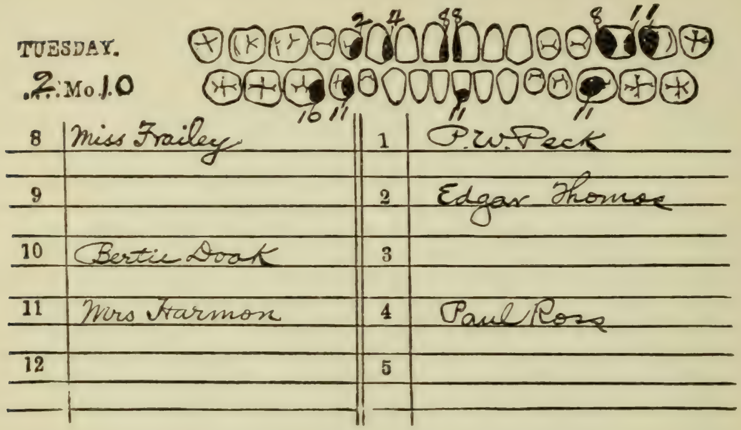
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TUESDAY.
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| 8 | Miss Frailey | 1 | P. W. Peck |
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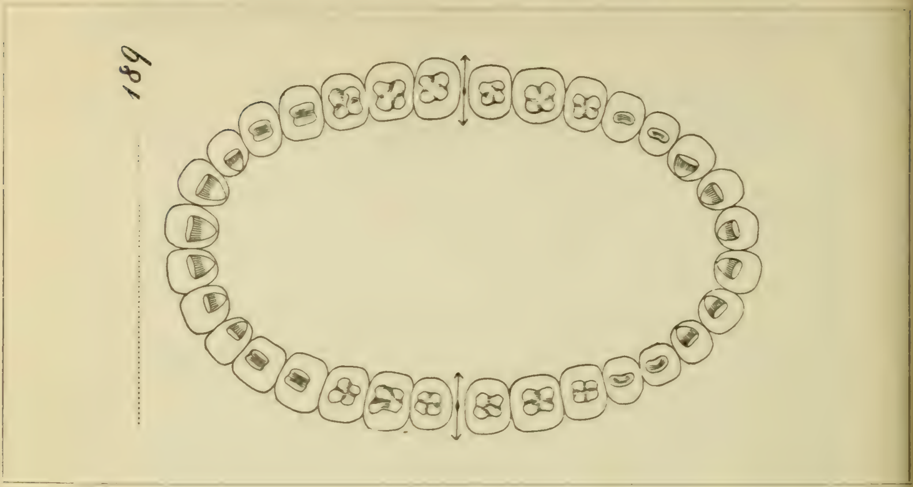
A. M. P. M. Wednesday 189

Neatly bound in leather, with aluminum stamp and gilt edges. Two styles, plain, and with fold-over flap, pocket, and pencil-holder.
Size 6 x 3¼ inches. Without date, and good for any time.

PRICES.

| | |
|---|---|
| Leather, plain | $0.50 |
| Leather, with flap, pocket, and pencil-holder | .75 |

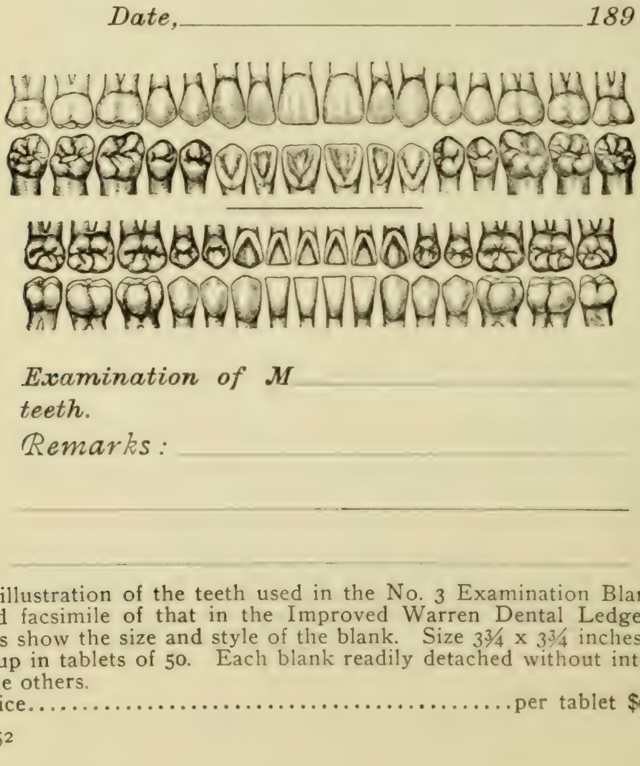
# MEMORANDUM BLANKS, No. 1.


189

The size and style are shown by the diagram. Plain backs. Size 4⅝ x 2⅜ inches. 100 in a tablet.
Price........................................per tablet $0.20

---

# EXAMINATION BLANKS, No. 3.

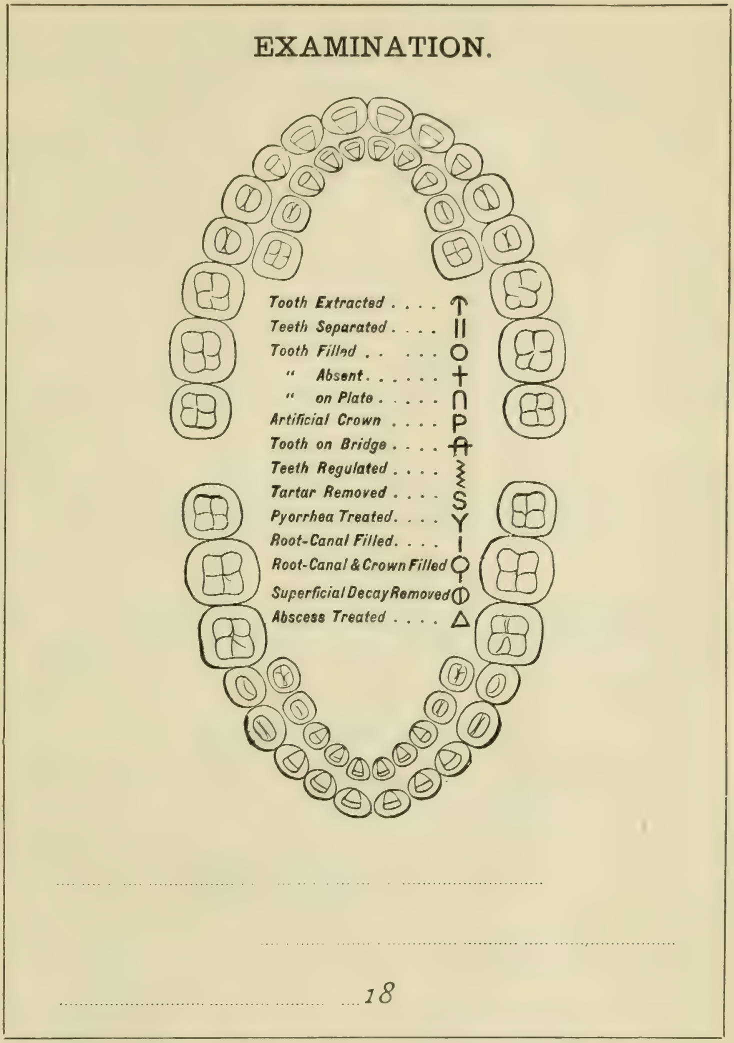

*Date,*__________________ ________*189*

*Examination of M*______________
*teeth.*
*Remarks:*______________

The illustration of the teeth used in the No. 3 Examination Blanks is a reduced facsimile of that in the Improved Warren Dental Ledger. The outlines show the size and style of the blank. Size 3¾ x 3¾ inches.

Put up in tablets of 50. Each blank readily detached without interfering with the others.
Price........................................per tablet $0.20

# EXAMINATION BLANKS, No. 2.



EXAMINATION.

*Tooth Extracted* . . . . ↑
*Teeth Separated* . . . . ||
*Tooth Filled* . . . . . O
*" Absent* . . . . . . +
*" on Plate* . . . . . ∩
*Artificial Crown* . . . . P
*Tooth on Bridge* . . . . ₳
*Teeth Regulated* . . . . ≷
*Tartar Removed* . . . . S
*Pyorrhea Treated*. . . . Y
*Root-Canal Filled*. . . . |
*Root-Canal & Crown Filled* ♀
*Superficial Decay Removed* ⦶
*Abscess Treated* . . . . △

........................................................................................................

........................................................................................................

.......................................................... 18

The diagram is a reduction of that used in the Improved Allport Dental Ledger, showing the symbols used to facilitate rapid book-keeping. The reverse side is made up in the form of a memorandum account, whereon any desired entries can be made to be afterward transferred to the Ledger.

Size 5⅜ x 3¾ inches. Put up in tablets of 50 each.

Price ..........................................per tablet $0.20

# BILL-HEADS.

The Bill-Heads comprised in our line of stationery for dentists' use can be used with any ledger, though most of them were devised to accompany special books. All are made of good paper. The several forms are shown half size on the succeeding pages.

### No. 1.

One of the oldest forms, but still in good demand. Diagram like that of the old-time Dentists' Account Book, which was a reduction of that of the original Allport Ledger.

Size 8½ inches wide by 7 inches long. Put up in tablets of 100.

Price........................................per tablet $0.60

### No. 2.

The diagram of the teeth used is that shown in Dental Cut No. 8 (page 58). A neat, small form.

Size 7¼ inches wide by 4¼ inches long. Put up in tablets of 100.

Price........................................per tablet $0.30

### No. 3.

Diagram of the teeth (deciduous and permanent) exactly like that of the Allport Improved Dental Ledger, which it was designed to accompany. Symbols shown on the Bill-Head.

Size 8½ inches wide by 7 inches long. Put up in tablets of 100.

Price........................................per tablet $0.60

### No. 4.

Originally designed as a companion piece to the Pettit System of dental account books, and containing the well-known diagram and symbols.

Size 8½ inches wide by 7 inches long. Put up in tablets of 100.

Price........................................per tablet $0.60

### No. 5.

Designed for use with the Improved Warren Dental Ledger. Diagram a reduced facsimile, same size as that shown in Examination Blank No. 3.

Size 7 inches wide by 8½ inches long. Put up in tablets of 100.

Price........................................per tablet $0.60

---

# SPECIAL BILL-HEADS.

All our stock Bill-Heads for dentists are printed all over,—that is, the lines are printed in black, the same as the typography. Of course, in using these the dentist has to write or stamp in his own name and address, as well as that of the patient. Those who prefer to have special Bill-Heads, with their own name and address printed on them, can have them made to order. We can supply them with the lines printed, as in the stock Bill-Heads, or ruled in red and blue, at the following prices:

| | Printed Lines. | Ruled Lines. |
|---|---|---|
| Nos. 1, 3, 4, 5, one hundred | $2.00 | $3.50 |
| “ “ two “ | 2.75 | 4.25 |
| “ “ three “ | 3.25 | 4.75 |
| “ “ five “ | 3.75 | 5.25 |
| “ “ one thousand | 6.00 | 7.75 |
| No. 2, one hundred | 1.90 | 3.40 |
| “ two “ | 2.40 | 3.90 |
| “ three “ | 2.90 | 4.40 |
| “ five “ | 3.40 | 4.90 |
| “ one thousand | 3.90 | 5.65 |

Larger numbers at the thousand rate. The prices for small lots look large; but all the special work has to be done for one the same as for a large quantity.

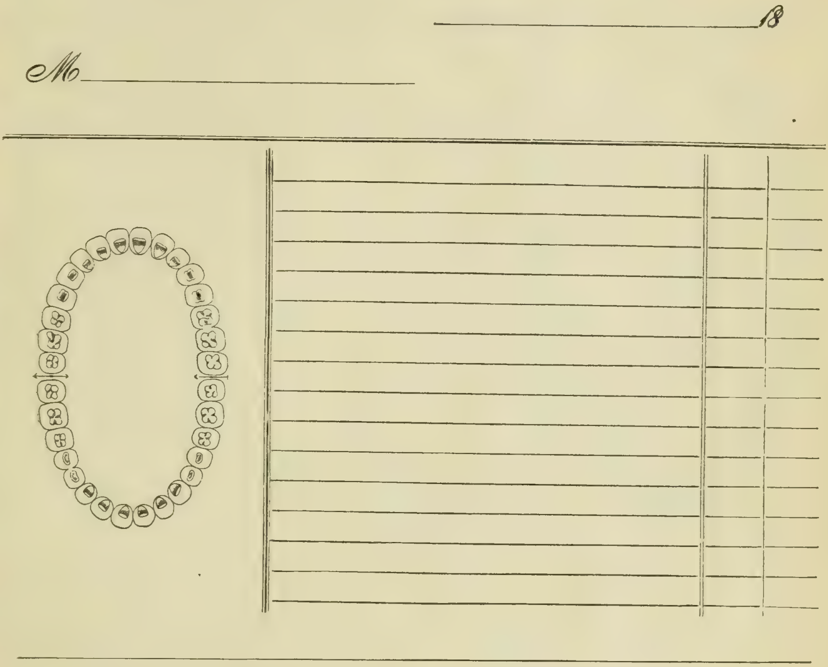
You can thus have your own bill-heads, by ordering in quantities, at the same rate if you use Nos. 1, 3, or 4, or at nearly the same rate for No. 2, as the stock Bill-Heads, provided you take them in the same style.

Ruled Bill-Heads cost a little more, but they are decidedly better looking.

# BILL-HEADS.

These **half-size** illustrations show the forms of Bill-Heads Nos. 1 and 2. For prices and description see page 54.

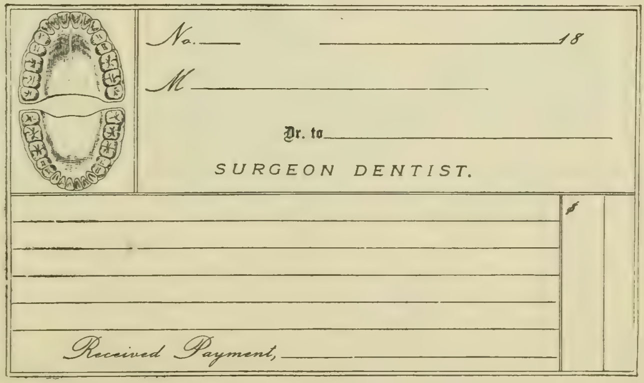
## No. 1.



18

M

## No. 2.



No.

18

M

Dr. to

SURGEON DENTIST.

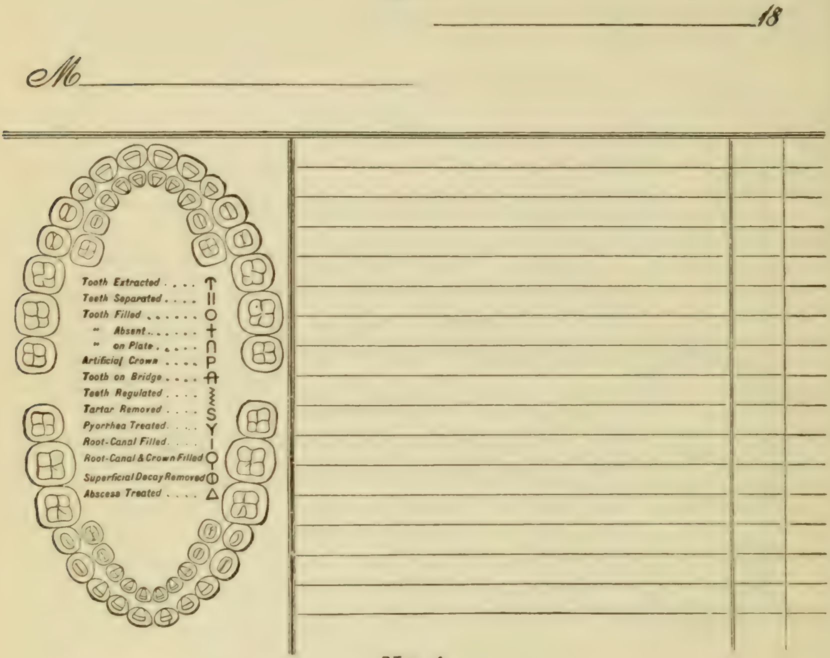
$

Received Payment,

# BILL-HEADS.

These **half-size** illustrations show the forms of Bill-Heads Nos. 3 and 4. For description and prices see page 54.

### No. 3.

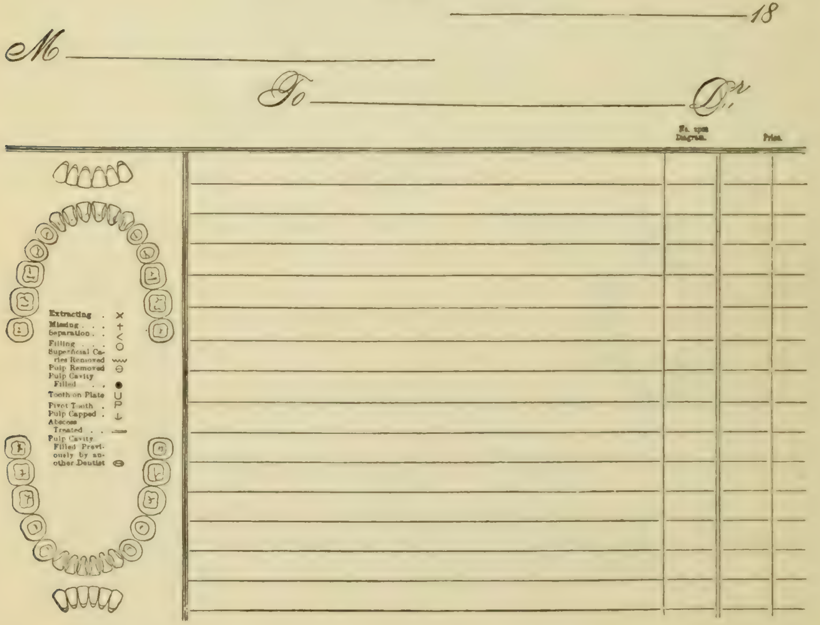


18

M

Tooth Extracted . . . . ⊤
Teeth Separated . . . . ‖
Tooth Filled . . . . . . O
" Absent . . . . . . +
" on Plate . . . . . ∩
Artificial Crown . . . . P
Tooth on Bridge . . . . ₳
Teeth Regulated . . . . ≀
Tartar Removed . . . . S
Pyorrhea Treated . . . . Y
Root-Canal Filled . . . . I
Root-Canal & Crown Filled ♀
Superficial Decay Removed ⊕
Abscess Treated . . . . △

### No. 4.



18

M

To

Dr.

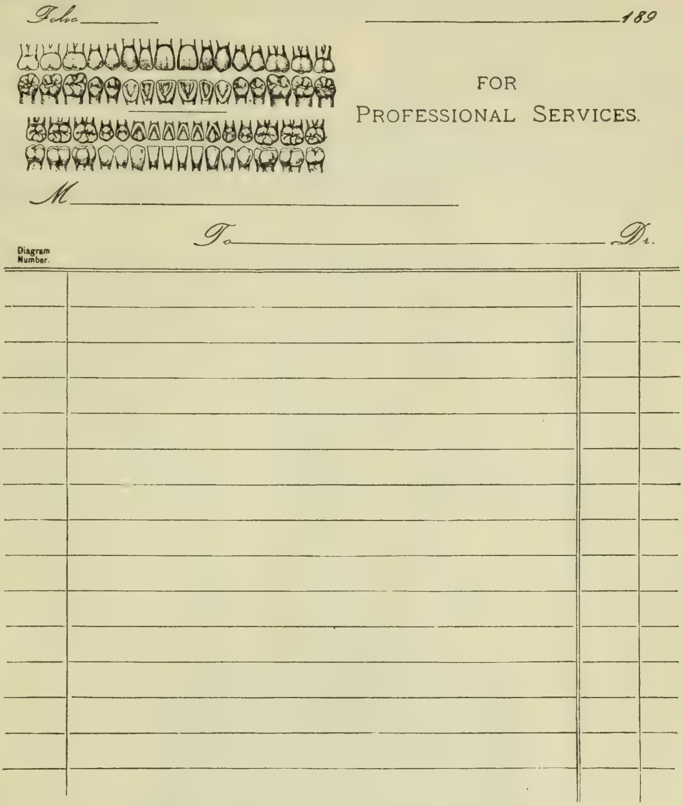
No. upon Diagram.

Price.

Extracting . ×
Missing . . . +
Separation . . <
Filling . . . O
Superficial Caries Removed ~~~
Pulp Removed ⊖
Pulp Cavity Filled . . ●
Tooth on Plate U
Pivot Tooth . P
Pulp Capped . ⊥
Abscess Treated . . —
Pulp Cavity Filled Previously by another Dentist ⊖

# BILL-HEAD No. 5.

This **half-size** illustration shows the form. For description and price see page 54.



Folio ________ ________________ 189

FOR
PROFESSIONAL SERVICES.

M ________________________

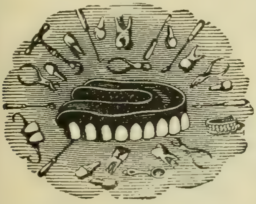
To ________________________ Dr.

Diagram Number.

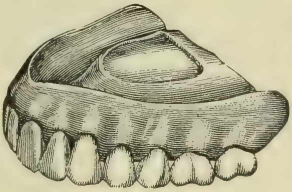
# ELECTROTYPE DENTAL CUTS.

Cuts for advertisements and business cards. They are the exact height of type, and can be furnished at the prices quoted below. Nos. 1, and 8 to 13, are mounted on wood. All the others on metal.

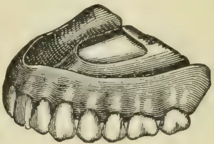
No. 2.



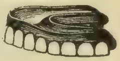
No. 5.



No. 6.



No. 4.



No. 7.

No. 3.

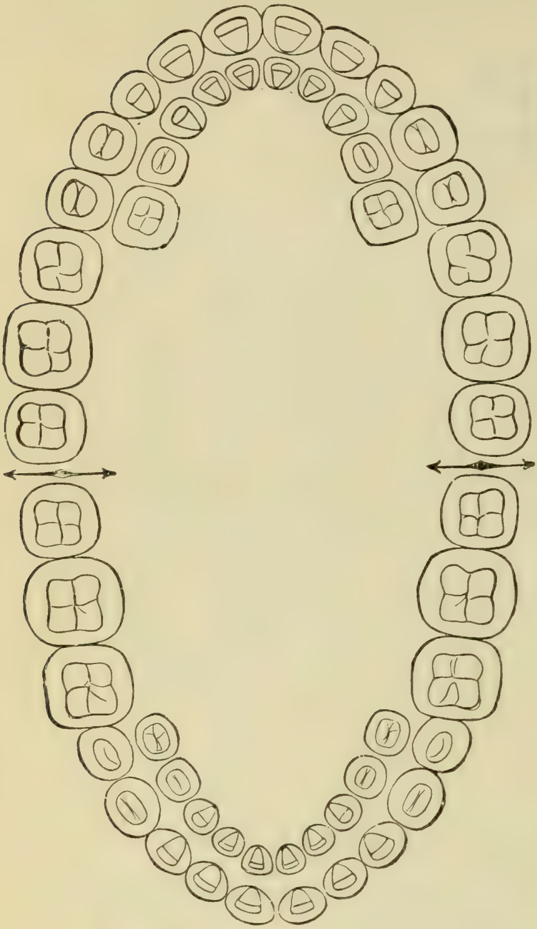
PRICES.

| | |
|---|---|
| Nos. 1 | $0.35 |
| " 2, 5 | .50 |
| " 3, 4, 7, 8, 13 | .30 |
| " 6 | .40 |
| " 9 | .60 |
| " 10, 11 | .20 |
| " 12 | .25 |

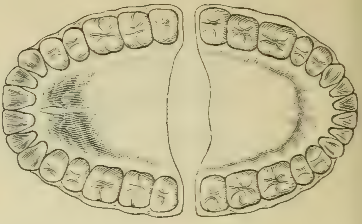
# ELECTROTYPE DENTAL CUTS.

For prices see page 57.

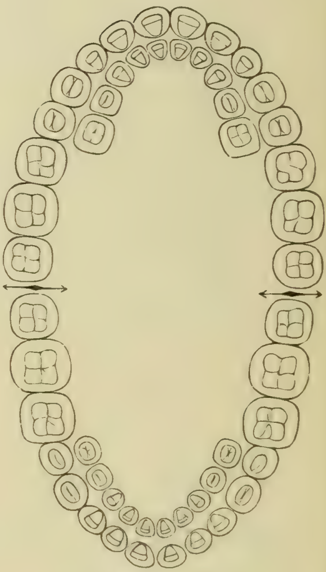
No. 9.



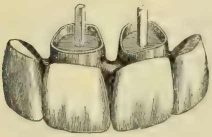
No. 8.



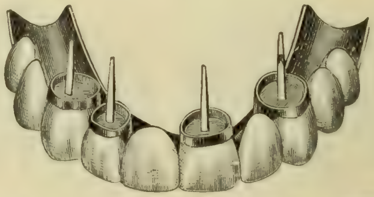
No. 1.



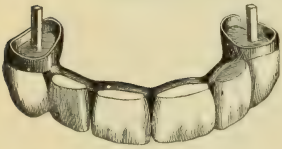
No. 10.



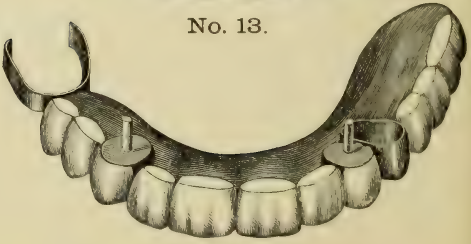
No. 12.



No. 11.



No. 13.



# THE PEERLESS DENTIFRICE.

This elegant dentifrice has the saponaceous character, cleanses perfectly, and has a peculiar combination of flavors which imparts a delightful fragrance to the breath, and leaves the mouth with a happy sensation of coolness and cleanliness. Oraline Paste thus has all the good points of the tooth-soap, with several other advantages inherent to itself, and is an elegant article for the toilet-table.

## IN TUBES.

In this form the Oraline Paste is extremely handy for travelers' use. Occupies little space, and replacing the screw-cap preserves it perfectly without waste. Each tube in a neat box. **In gross lots the dentist can have his name and address printed on the labels without extra charge.**

| | |
|---|---|
| Price, per gross | $25.50 |
| " per dozen | 2.50 |
| " each | .25 |

## IN OPAL GLASS JARS.

**Small.**

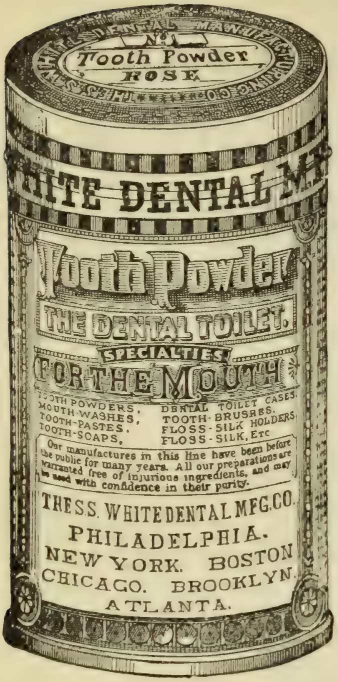
For home use opal glass jars are perhaps preferable to tubes. We supply the Paste in two sizes of jars, the larger containing 2½ oz. and the smaller 1½ oz. They are provided with screw caps having nickeled rims, and handsome lithographed label in gold and colors.

With each jar is a metal spoon, the use of which will be found preferable to dipping the brush into the jar.

PRICES.

| | | | | | |
|---|---|---|---|---|---|
| Large | per gross | $40.80 | Small | per gross | $25.50 |
| " | " dozen | 4.00 | " | " dozen | 2.50 |
| " | each | .35 | " | each | .25 |

# TOOTH-POWDERS.



FIVE VARIETIES.

No. 1, Rose,
No. 1, Wintergreen,
No. 2,
No. 3,
Phenated.

Put up in Handsome Enameled Metal Cans and Flasks. The quarter-pound, half-pound, and pound Cans are round; the four-pound are square with rounded corners. The Flasks (see page 62) are oval, with screw-top, and hold two ounces.

---

## No. 1 TOOTH-POWDER.

### Two Flavors—Rose and Wintergreen.

**An Elegant, Pleasant, and Efficient Dentifrice, highly recommended as a Toilet Article for both old and young.**

This Powder has been known to the dental profession and to the public more than a third of a century. It has had an immense sale, and has received general and hearty indorsement. It is intended to meet all the requirements of a dentifrice for general use, combining elegance with efficiency, and it may be used with pleasure and benefit at all ages. It is highly perfumed with delicate oils, and is in every respect as perfect as we know how to make it.

Please state the flavor desired. When flavor is not mentioned we send Rose.

PRICES.

| | | | |
|---|---|---|---|
| Rose or Wintergreen Tooth-Powder, | 4-lb. cans | .........each | $5.00 |
| " " " | 1-lb. " | ......... " | 1.50 |
| " " " | ½-lb. " | ......... " | .90 |
| " " " | ¼-lb. " | ......... " | .50 |

A discount of 15 per cent. will be made to dentists on 5-lb. lots; 25 per cent. on 10-lb. lots, and 30 per cent. on 50-lb. lots.

# TOOTH-POWDERS.

## Phenated Tooth-Powder.

Designed to combine the ordinary abrasive and antacid qualities of a dentifrice with disinfecting and deodorizing properties. It is recommended in those cases where the condition of the teeth or gums causes an offensive breath, and in scorbutic and aphthous conditions of the mouth. It is pleasant to the taste, cooling to the gums, sufficiently abrasive for cleaning the teeth, and is altogether unexceptionable as a daily toilet article.

PRICES.

| | | | | | |
|---|---|---|---|---|---|
| Phenated | 4-lb. | Enameled | Cans | each | $5.00 |
| " | 1-lb. | " | " | " | 1.50 |
| " | ½-lb. | " | " | " | .90 |
| " | ¼-lb. | " | " | " | .50 |

On Phenated Tooth-Powder a discount of 15 per cent. will be made to dentists on 5-lb. lots; 25 per cent. on 10-lb. lots, and 30 per cent. on 50-lb. lots.

## No. 2 Tooth-Powder.

For real value as a cleansing powder for daily use the No. 2 is equal to the No. 1, but it is less elegantly colored and less delicately perfumed. Like the No. 1, however, it may be used with entire confidence by children and adults.

| | | | | | |
|---|---|---|---|---|---|
| Price, | 4-lb. | Enameled | Cans | each | $3.50 |
| " | 1-lb. | " | " | " | 1.00 |
| " | ½-lb. | " | " | " | .60 |
| " | ¼-lb. | " | " | " | .35 |

## No. 3 Tooth-Powder.

Though designed more for real efficiency than for elegance, this is nevertheless an agreeable and excellent preparation. It is composed of pure materials, and meets all the requirements of cleanliness. It differs from the higher-priced powders in color, odor, and taste,—not in essential qualities.

| | | | | | |
|---|---|---|---|---|---|
| Price, | 4-lb. | Decorated Tin | Cans | each | $2.50 |
| " | 1-lb. | " | " | " | .75 |
| " | ½-lb. | " | " | " | .45 |
| " | ¼-lb. | " | " | " | .25 |

A discount of 10 per cent. on Nos. 2 and 3 in 10-lb. lots will be made to dentists.

# Decorated Tooth-Powder Flask.

FIG. 1.

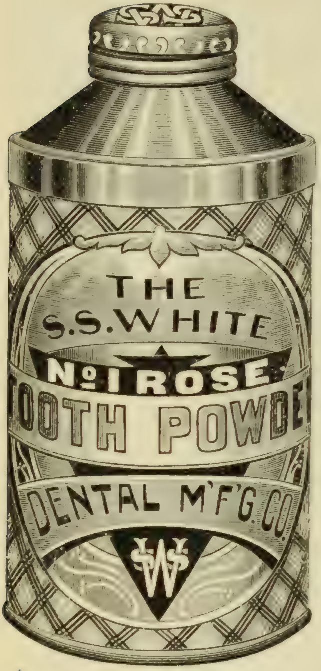
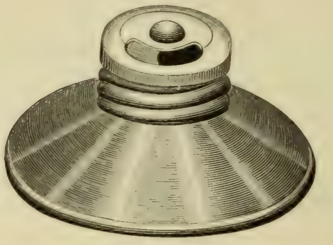


FIG. 2.



In this device we offer an improved tooth-powder holder. The special improvement is in the opening in the top, which can be adjusted to permit varying quantities of powder to pass. When closed the powder cannot sift out in the trunk or hand-bag. It has a screw-cap, which being removed shows the adjustable opening, Fig. 2. By this arrangement the flow of the powder is entirely under control.

It is well made, will stand considerable hard usage, and is thus better adapted to the needs of travelers than glass bottles, while its neatness and usefulness will commend it to all classes.

The Flask is handsome, convenient, and substantial. It holds something more than two ounces of tooth-powder.

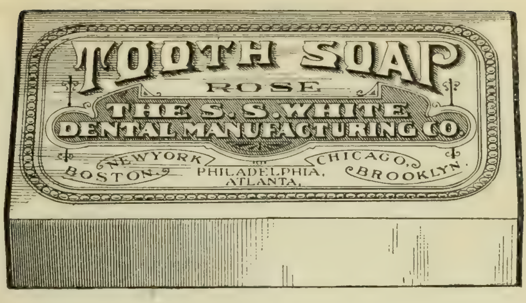
With a view to affording dentists the opportunity to supply our Flask to their patrons, we offer it in quantities at prices which will pay them to handle it.

PRICES.

Filled with No. 1 Rose, Wintergreen, or Phenated Tooth-Powder.

| | |
|---|---|
| Each | $0.25 |
| Per dozen | 2.00 |
| Per half-gross | 10.00 |

# TOOTH-SOAPS.



Composed of the purest white soap, cocoanut oil, English precipitated chalk, orris root, white sugar, and aromatics, warranted of the best quality. These are so skillfully combined that, while the resulting dentifrice has all the cleansing properties of the best soaps, the peculiar soapy taste is completely masked. We have three flavors,—

**MINT, WINTERGREEN, ROSE,**

experience having demonstrated that these leave the most agreeable taste in the mouth after use.

Put up in cakes 2½ inches long, 1⅜ inches wide, and ⅝-inch thick, and inclosed in a neat decorated box. Each cake, as a guarantee of quality, is stamped on the top with the name "S. S. White Dental Mfg. Co.," and name of the flavor on the bottom.

| | Per gross. | Per doz. | Per cake. |
|---|---|---|---|
| Price, Mint or Wintergreen................ | $21.00 | $2.00 | $0.25 |
| " Rose .............................. | 27.00 | 2.50 | .30 |

---

# TARTARLITHINE.

An acid salt of lithium which has been found to have a greater solvent power for uric acid in the system of gouty and rheumatic patients than any other agent previously introduced. It is therefore indicated in all disorders in which the uric-acid diathesis figures as a factor. Renders the blood distinctly alkaline.

Tartarlithine is remarkably effervescent. A tablet dropped into a glass of water disappears entirely in a few moments, and the water is converted into a most agreeable acidulated drink.

It serves as an efficient helper to the dentist in such forms of pyorrhea alveolaris as are found co-existent with the gouty diathesis, and allied troubles. The effect of the administration is to eliminate the uric-acid products, and so eradicate the principal obstacles in the way of a cure.

Put up in 5-grain tablets, 100 to the bottle. They can be allowed to dissolve on the tongue or to effervesce in water.

Price.............................................per bottle $1.00

# PAID ADVERTISEMENTS.

**The publisher of the DENTAL COSMOS disclaims any responsibility for statements or claims made in this department of its advertisements.**

## RECOGNITION, RESULTS.

**It has taken some Dentists a long time** to fully realize that **WILSON'S LOCAL ANESTHETIC** can be implicitly depended upon under all circumstances. As soon as they came to know this from their own experience, by employing **WILSON'S** exclusively, **better** results followed. Over 17,000 dentists have one by one cast down the bars and given it a permanent place in their practice. We invite and urge you to put **WILSON'S LOCAL ANESTHETIC** to any test you choose. It is guaranteed not to fail you in a single case. Non-secret; a list of contents accompanies every bottle.

**For sale by all Dental Houses, or mailed on receipt of price. 1 oz. $1.00, 2 oz. $2.00, 6 oz. $5.00, 20 oz. $15.00. Manufactured by**

## CENTRAL CHEMICAL CO.,

WELLSVILLE, N. Y., U. S. A.

THE BEST ANTISEPTIC.

# LISTERINE.

Invaluable to the Dental Practitioner.
Indispensable for the Dental Toilet.

To Cleanse and Deodorize before Operating.
To Wash and Purify the Mouth after Extracting.
To Treat Antiseptically all Diseases of the Oral Cavity.
To Prescribe as a Detergent Prophylactic Mouth-wash.

Listerine is a perfect tooth and mouth-wash, and has received the Highest Recognition as the Best General Antiseptic for a

DENTIST'S PRESCRIPTION.

☞We shall be pleased to send you "Listerine in Dental Practice," embodying full and exhaustive reports of the antiseptic value and utility of Listerine.

**LAMBERT PHARMACAL CO., ST. LOUIS, U. S.**

British, French, German, Spanish, and Canadian Trade constantly supplied.

---

THE FOUR SEASONS
Have no effect on the behavior of the

# IMPROVED AMES' METALLOID CEMENT.

It has all of the desirable working qualities, and in ***Crushing Machine*** tests, made by disinterested parties, has been found to be the strongest cement for crown setting on the market.

Three colors—white, pearl-gray, and gray.

One-color package $1.00.

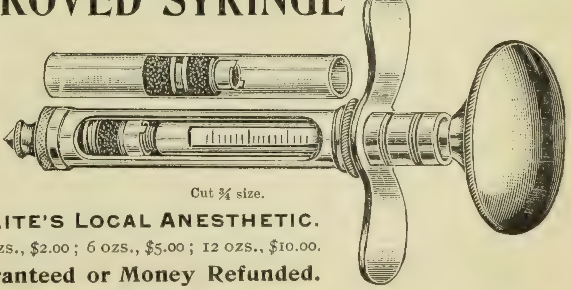
We have also Oxy-Phosphate of Copper.

W. V-B. AMES, 36 Washington St., Chicago.

---

THIS IMPROVED SYRINGE

in an elegant case will be given away **free** with 12 ounces



Cut ¾ size.

**DR. R. B. WAITE'S LOCAL ANESTHETIC.**

1 oz., $1.00; 2 ozs., $2.00; 6 ozs., $5.00; 12 ozs., $10.00.

**Satisfaction Guaranteed or Money Refunded.**

Prepared only by

**THE ANTIDOLAR MFG. CO., Springville, New York, U. S. A.**

Orders can be filled by nearly every dental depot in the world.

INFORMATION
FOR PATIENT AND DENTIST
DENTAL AND ORAL HYGIENE AND
$1.00 A YEAR
A MAGAZINE FOR THE RECEPTION ROOM TABLE
PUBLISHED MONTHLY BY L. P. BETHEL, KENT, OHIO

The most prominent men in the dental profession are writing the *special instruction articles for Patients.*

Keep the magazine on your office table, and

**It is Sure to Increase Your Practice.**

You cannot afford to miss a single number of "Information." Send $1.00 for a year's subscription.

Address,

**DR. L. P. BETHEL,**
**Editor and Publisher,**
**Kent, O.**

---

HAVE YOUR

**Gold Crown- and Bridge-Work**

MADE AT THE

**Phila. Crown Laboratory**

45 N. THIRTEENTH STREET
PHILADELPHIA

REMEMBER WE ARE IN POSITION TO DO BUSINESS WITH EVERY DENTIST IN THE UNITED STATES.

. . .

REGULATING APPLIANCES OF EVERY DESCRIPTION MADE TO ORDER.

All Crowns are special,—*i.e.*, all are made according to the requirements of each individual case.

We guarantee satisfaction. To insure the most desirable results, it is necessary to send good models with wire size of teeth to be capped.

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SPECIALTIES.—Crown, Bridge, and Continuous-Gum Work, Hand-carved Teeth.

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An old established dental practice in town of 17,000. Practice amounted to $4500 in 1896 and about $6000 in 1897. Will run about the same this year. Reasons for selling, health and other business to attend to. Address,

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## OPERATOR WANTED.

Thirty dollars per week and commission. Steady position to first-class man, registered in New York State. Must be crown- and bridge-worker. Address,

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# LOUISVILLE COLLEGE OF DENTISTRY,

Dental Department of the
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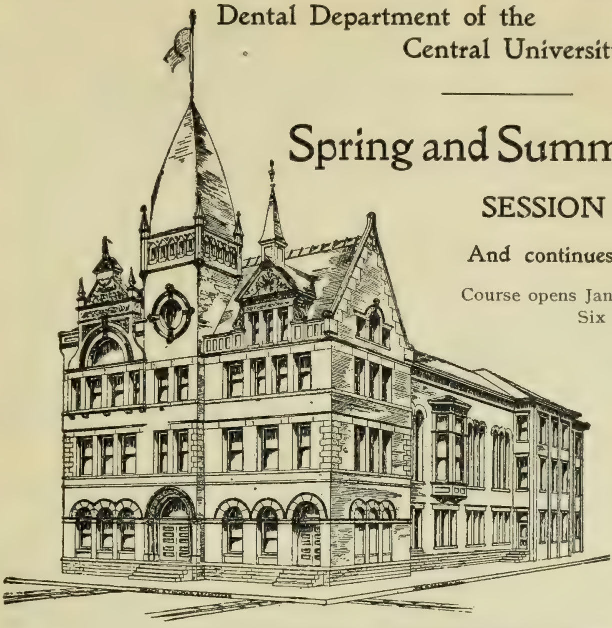

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**DETROIT, MICH.**

Established 1891.

MEMBER OF NATIONAL ASSOCIATED FACULTIES, and recognized by the NATIONAL BOARD OF EXAMINERS.

THE SEVENTH ANNUAL SESSION will begin S ptember 29, 1898, and continue nine months.

THREE FULL COURSES OF STUDY of nine months each are required for graduation.

FEES—Matriculation, $5.00; Regular Course, $60.00; Graduation, $30.00.

A perpetual ticket (not transferable), good for three or more courses, will be issued for $150. For full particulars and annual announcement, address

**DR. H. O. WALKER**, Secretary, No 27 Adams Avenue, East,
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---

# Missouri Dental College.—St. Louis Medical College.

Departments of Washington University,

ST. LOUIS, MO.

Session begins September 28, 1897, and ends April 28, 1898. Our laboratories are well equipped and admirably adapted for the comfort and instruction of 400 students. Our Dental Infirmary offers unequaled opportunities for practical instruction. Our clinical facilities are of the best, and include out-clinics, private hospitals, and a full share of the work in the city institutions.

Many years' experience as schools of high standard have perfected the three years' graded course.

Apply at the College Building, 1806-1814 Locust St.

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# UNIVERSITY OF MARYLAND.

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***N. E. COR. LOMBARD AND GREENE STREETS, BALTIMORE, MD.***

**Hon. SEVERN TEACKLE WALLIS, LL.D., Provost.**

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FRANCIS T. MILES, M.D., Professor of Physiology.
L. McLANE TIFFANY, M.D., Clinical Professor of Oral Surgery.
RANDOLPH WINSLOW, M.D., Professor of Anatomy.
R. DORSEY COALE, Ph.D., Professor of Chemistry and Metallurgy.
I. EDMONDSON ATKINSON, M.D., Professor of Materia Medica and Therapeutics.
JOHN C. UHLER, M.D., D.D.S., Demonstrator of Mechanical Dentistry.
ISAAC H. DAVIS, M.D., D.D.S., Demonstrator of Operative Dentistry.
I. HOLMES SMITH, M.D., RIDGELY B. WARFIELD, M.D., } Demonstrators of Anatomy.

The Principal Demonstrators are assisted by sixteen Assistant Demonstrators. **Special Instructions are given in Continuous-Gum and Bridge-Work.**

---

At stated times during the Annual Sessions a number of prominent dental practitioners will hold Clinics and deliver Clinical Lectures.

Each year since its organization has added to the reputation and prosperity of this University Dental School, until now its graduates, in almost every part of the civilized world, are meeting with the success that ability will ever command. The past session was the most successful one in number of matriculates ever held; and visiting dentists from all parts of this country have expressed themselves as being astonished and gratified at the ability shown by the students when operating upon patients in the infirmary. Forming one of the departments of ONE OF THE OLDEST UNIVERSITIES in this country, its diploma is everywhere recognized and honored.

The instruction in both operative and mechanical dentistry is as thorough as it is possible to make it, and embraces everything pertaining to dental art. The advantages which the general and oral surgical clinics to which the dental students are admitted, as indeed to all the lectures of the University, afford, cannot be overestimated. The many thousands of patients annually treated in the University Hospital, well known to be the largest Hospital in Baltimore, afford an abundance of material for dental infirmary and laboratory practice, and the oral surgery clinics.

The Infirmary and Laboratory practice for students is exceptionally large, a fact that adds so greatly to the facilities of this Dental School.

The Dental Infirmary and Laboratory Building is one of the largest and most complete structures of the kind in the world. The Infirmary is lighted by forty-seven large windows, and is furnished with the most improved operating chairs. It has again become necessary to enlarge the Dental Building, making an Infirmary nearly one hundred feet long, and a Laboratory eighty feet long and forty-three feet wide.

The Dental Infirmary and Laboratory are open daily (except Sunday) during the entire year for the reception of patients; and THE PRACTICE OF DENTAL STUDENTS has increased to such an extent that all the students during the past season have had an abundance of practical work in both operative and prosthetic dentistry. This means for practical instruction has already assumed such large proportions that the supply has been beyond the needs of the large classes in attendance during the past sessions. The exceedingly large number of patients for the extraction of teeth affords ample facilities for practical experience to every student.

In addition to the facilities afforded by this institution for a thorough course of instruction in the theory and practice of dentistry, the clinics in the University Hospital enable the Dental equally with the Medical Students to become familiar with the diseases and operations of Practical Surgery. Excisions of jaw, partial or entire; tumors, cancerous or benign, of various parts of the buccal cavity; plastic operations for restoration of cheek, lips, etc., may be mentioned as having been before the class during the year. The induction of anesthesia by means of different agents—ether, chloroform, bromide of ethyl, nitrous oxide gas, all being used in the clinics—cannot fail to be of use to the student of Oral Surgery. Junior as well as Senior students are afforded every opportunity for practical instruction in both operative and mechanical dentistry.

The Lecture Halls in the University Buildings are large and well lighted; and every facility will be afforded for practical and theoretical dental instruction. Demonstrations in Anatomy, Physiology, and Pathology (for which an abundance of material is furnished free of charge) also form an important part of the regular course. The Dissecting Room is large, well ventilated and lighted, and the Demonstrator of Practical Anatomy passes much of his time in assisting the students and directing their labors. Dissecting Material is furnished in abundance, free of charge.

The Qualifications for Admission and Graduation are those adopted by the National Association of Dental Faculties and the State Dental Examining Boards. The Diplomas of this School are recognized by all State Dental Examining Boards.

Qualifications for Graduation: The candidate must have attended three full courses of lectures of five months each in different years at the Regular or Winter Sessions in this institution. As equivalent to one of these, one course in any reputable dental college will be accepted. Graduates of medicine can enter the Junior Class. The matriculant must have a good English education; a diploma from a reputable literary institution, or other evidence of literary qualifications will be received instead of a preliminary examination. All students, both juniors and seniors, have equal advantage in operative and mechanical dentistry in this institution throughout every session.

Graduation in Medicine: Graduates of the Dental Department of the University of Maryland are required to attend but one session at the University School of Medicine prior to presenting themselves as candidates for the degree of "Doctor of Medicine." (See Catalogue.)

The Regular or Winter Session will begin on the 1st day of October, and will terminate in March of each year.

The Summer Session, for practical instruction, will commence in March, and continue until the Regular Session begins. Students in attendance on the Summer Session will have the advantage of all the daily Surgical and Medical Clinics of the University.

The fees for the Regular Session are $100, Demonstrators' fees included; Matriculation Fee, $5; Diploma Fee, for candidates for graduation, $30; Dissecting Ticket, $10.

For Summer Session, no charge to those who attend the following Winter Session.

Board can be obtained at from $3.50 to $5 per week, according to quality.

The University Prize and a number of other Prizes will be specified in the annual Catalogue.

Students desiring information and the annual Catalogue will be careful to give full address and direct their letters to

**F. J. S. GORGAS, M.D., D.D.S.,**
*Dean of the Dental Department of the University of Maryland,*
**845 N. Eutaw Street, Baltimore, Md.**

---

# Michigan University Dental College.

ADMISSION EXAMINATIONS are held during the last week of June and September.

THE ANNUAL TERM begins October 1 and continues for nine months, closing the last week in June.

THE AVERAGE ANNUAL FEES for tuition and laboratory expenses will be about $65 for non-residents of Michigan.

THE ANNUAL ANNOUNCEMENT contains particulars and will be sent on request.

J. TAFT, Dean,
**Ann Arbor, Mich.**

---

## THE STOWE AND EDDY

# Prosthetic Dental School,

171a TREMONT ST., BOSTON, MASS.

Instruction given in everything pertaining to Prosthetic Dentistry by all the up-to-date methods. No classes. Students may enter at any time.

Send for circular.

# PHILADELPHIA DENTAL COLLEGE

## AND HOSPITAL OF ORAL SURGERY.

Removed to New Building, 18th and Buttonwood Streets.

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## ANNOUNCEMENT.

**The College Year** begins with the Spring Session, April 15, which session continues until the last day of May. The Winter Course commences October 10, and closes early in the ensuing April. A preliminary Fall Course opens September 1.

**The Dispensary and Laboratory** are open all the year, except during July and August. Instruction in PRACTICAL DENTISTRY is a prominent feature of the institution. This work is under the supervision of an executive committee composed of the practicing dentists of the school, the members of which, aided by competent Demonstrators, give special attention to the interests of students. The Dispensary consists of large, well-lighted rooms, furnished with comfortable operating-chairs, tables, and all conveniences, so that the opportunities here presented for acquiring a knowledge of clinical dentistry are ample and complete. The new laboratory is the largest of its kind in the country. A clinic in ORAL SURGERY is held every Saturday at 12 M.

**Graduation.**—Attendance on three courses of Lectures and satisfactory examinations in theory and practice are required for graduation. Graduates in medicine and pharmacy are eligible for graduation in Dentistry after attendance on Lectures and Clinical Service during two courses. These are excused from examination on subjects previously passed.

**Fees.**—Tickets for each course, including the Demonstrator's, $100; Matriculation, inclusive of Syllabi for home study, $5 for each course; Examination and Diploma Fee, $35. Board $4 to $6 per week.

Special Clinics, for the study and treatment of Diseases of the Teeth, are held twice weekly by Profs. STELLWAGEN and GREENBAUM, and on Crown- and Bridge-Work Wednesdays and Saturdays at 8 A.M., by Prof. GUILFORD.

Special Lectures on Oral Surgery are given Monday Evenings at 8 o'clock, by Prof. BŒNNING.

**Examinations.** FIRST YEAR.—Progress in Anatomy, Physiology, Materia Medica, and Anesthesia, Histology, and Bacteriology. SECOND YEAR.—Progress in Chemistry, Prosthetic and Operative Dentistry, Pathology and Therapeutics, and final in Anatomy, Physiology, Materia Medica and Anesthesia, Histology, and Bacteriology. THIRD YEAR.—Final in Chemistry and Metallurgy, Prosthetic and Operative Dentistry, and Dental Pathology and Therapeutics.

**Graduation in Medicine.** Graduates in dentistry desiring to take the Medical degree continue their studies in a Medical College for two additional years.

**Practical Requirements.** FIRST YEAR.—Technical course of tooth-study, including macroscopic anatomy, section-cutting, silhouette printing, free-hand drawing, and root-canal treatment and filling. Manipulation of dental materials. Making of experimental vulcanite and metal plates, and altering and repairing of same. Making denture on metal with vulcanite attachment. SECOND YEAR.—Preparation and filling of at least twenty-four cavities in extracted teeth. Preparations of roots and making and mounting of six dowel crowns, three metal crowns and jackets, a piece of bridge-work, and general plate-work for patients. Also operative practice on patients and making of depositing plate. Dissection and chemical laboratory work. THIRD YEAR.—Making of practical metal denture, requisite graduation fillings, chemical laboratory work, preparation of alloys, and general infirmary practice.

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HENRY H. BURCHARD, M.D., D.D.S., Special Lecturer on Dental Pathology and Therapeutics.
H. H. BOOM, M.D., Lecturer and Assistant to Chair of Chemistry.

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J. W. MOFFITT, D.D.S., Prosthetic Dentistry, Block and Continuous-Gum Work.
GEO. A. MAGEE, D.D.S., Operative Dentistry.
JOS. R. C. WARD, D.D.S., Prosthetic Dentistry.
W. H. DOLMAN, D.D.S., Prosthetic Dentistry, Crown- and Bridge-Work.
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ROBT. O. VAN DEUSEN, D.D.S., Assistant Crown- and Bridge-Work.
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H. AUGUSTUS BACON, M.D., Histology and Bacteriology.
T. C. STELLWAGEN, JR., D.D.S., Assistant in Oral Surgical Clinic.
EDW. A. PENNINGTON, D.D.S., Assistant in Oral Surgical Clinic.
S. J. OTTINGER, M.D., Assistant in Oral Surgical Clinic.
CHARLES F. WILBUR, Dental Technics.

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C. E. Francis, D.D.S.
H. C. Register, M.D., D.D.S.
F. D. Gardiner, D.D.S.
W. G. A. Bonwill, D.D.S.
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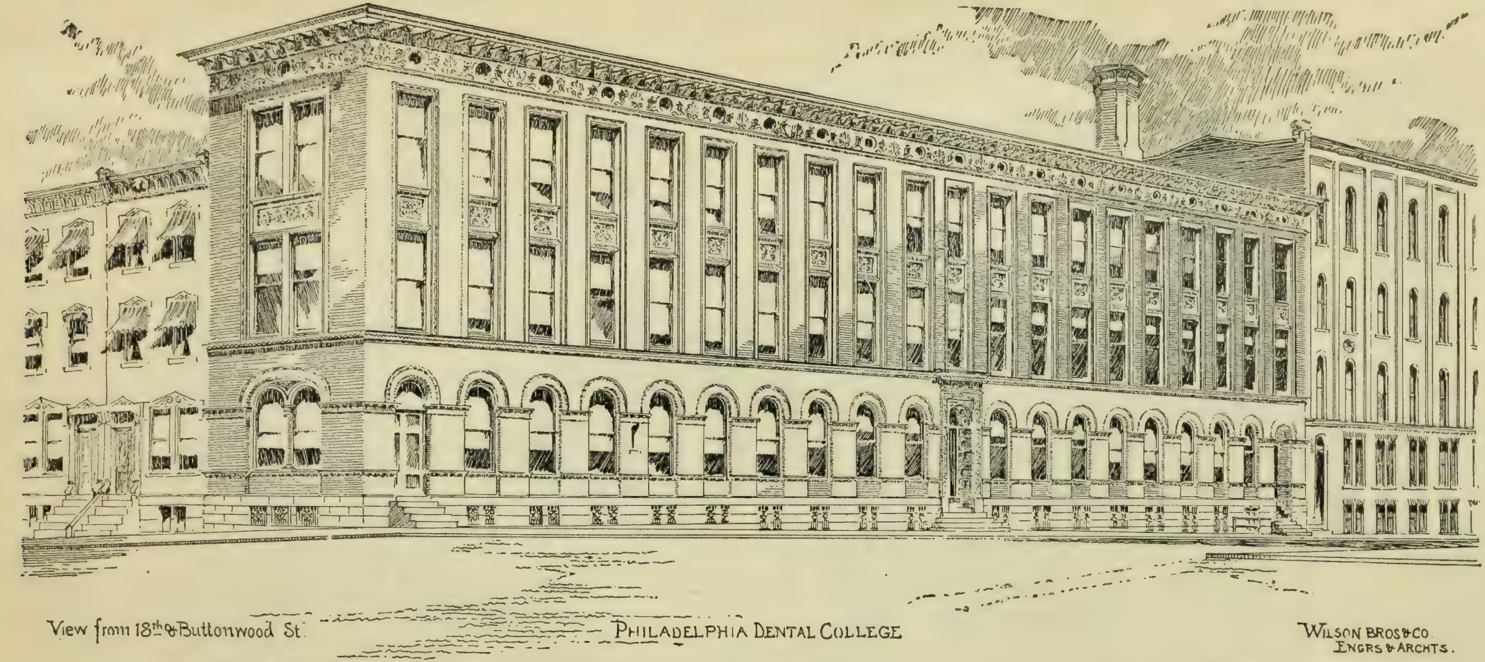
**DR. S. H. GUILFORD, Dean of the Faculty, 1728 Chestnut St., Phila., Pa.**


View from 18th & Buttonwood St.
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## The New Buildings of the Philadelphia Dental College and Hospital of Oral Surgery,

### AT 18th AND BUTTONWOOD STREETS.

North Front of 200 feet on Buttonwood Street, extending 179 feet to Hamilton Street. Three Stories in height on Buttonwood and Five Stories on Hamilton Street.

There is a large lecture room for 482 and an amphitheater for 606 students. The basement contains chemical laboratory, recitation rooms, tank and embalming rooms, boiler and engine rooms, storage for bicycles, etc. The first floor comprises offices, museum, hospital, assembly room, etc. The second floor is devoted to dental operating rooms, with a frontage of 200 feet facing north, and an extension at right angles of 179 feet, giving an exposure of 379 feet to the most desirable light for dental operations. The third floor is the same as the second, and is devoted to the dental laboratories. The fourth floor back contains dissecting room, special lavatories, etc.

# BOSTON DENTAL COLLEGE.

## 563 TREMONT STREET.

## 1898-9.

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JOSEPH K. KNIGHT, D.D.S., Professor of Dental Art and Mechanism.
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### Instructors in Mechanical Department.

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Instructor in Orthodontia,
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Instructor in Anesthesia.
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T. LEARY, M.D.

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GEORGE A. BATES, D.D.S.

The year begins on the second Monday in September and ends on the third Wednesday in June.

It is the object of the Faculty to present a complete course of instruction in the theory and practice of Dentistry; for this purpose a well-appointed laboratory and infirmary are provided, at which there is an ample number of patients, insuring to all students abundant opportunities for operating at the chair and becoming by actual practice familiar with all the operations demanded of the dentist.

The Laboratory and Operating Room are open at 9 o'clock A.M. Demonstrators are present daily during working hours.

Students who began their professional studies elsewhere may be admitted to advanced standing. No student can advance with his class or be admitted to advanced standing until he has passed the required examination on the studies of the previous year.

Every candidate for the degree must have passed a satisfactory examination in every one of the departments of dental instruction at regular periods of the College course.

All candidates for admission are required before examination to produce certificates of good moral character, and students from other colleges are required to bring certificates from those colleges of honorable dismission. For admission they must present a degree in letters, science, or medicine from a recognized college or scientific school, or pass an examination in the following subjects:

(**a.**) **English.**—The writing of a short essay upon some assigned topic.

(**b.**) **Geography.**—Such knowledge of this branch as is obtained by the graduate of a high school.

(**c.**) **History.**—A knowledge of American history.

(**d.**) **Mathematics.**—1. Arithmetic: Common and decimal fractions; ratio and proportion; percentage; metric system of weights and measures; square root. 2. Algebra: Fundamental operations; factoring; simple equations.

(**e.**) **Physics**—Elementary physics (Balfour Stewart, or its equivalent).

(**f.**) **Electives.**—Any one of the following: Algebra, Latin: Translation of easy Latin prose. French: Translation of short sentences into English. German: Elementary German grammar; translations into English. Botany: Structure of flowering plants.

Candidates from foreign countries must be able to speak the English language.

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### FEES AND EXPENSES.

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| For Matriculation | $5.00 |
| For a year | 100.00 |
| For Demonstrator's Ticket (Anatomy) | 10.00 |

There is no Diploma Fee and no Fee for Graduation.
For further information, address

**J. A. FOLLETT, M.D., Dean, 85 Water St., Boston, Mass.**

# University of California.

## COLLEGE OF DENTISTRY,

### Donohoe Building, Corner of Market and Taylor Streets,

### SAN FRANCISCO.

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CHAS. P. HAUSELT, D.D.S., Demonstrator of Mechanical Dentistry.
OSCAR TOBRINER, M.D., D.D.S., Demonstrator of Operative Dentistry.
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JAMES G. SHARP, M.D., D.D.S., Assistant to the Chair of Physiology and Histology.
S. P. TUGGLE, M.D., Demonstrator of Anatomy.
EDWIN BUNNELL, A.B., M.D., Junior Assistant Demonstrator of Anatomy.
L. D. BACIGALUPI, M.D., Junior Assistant Demonstrator of Anatomy.

The 18th Session opens Monday, August 21, 1899, and closes May 31, 1900. No student can be admitted for this session later than September 1, 1899.

The preliminary examinations for entrance will be held at the College building, corner Market and Taylor Streets, August 18 and 19, at 9 A.M.

Examinations include English, Physics, Latin, and any four of the electives, including Chemstry, French, German, Algebra, Plain Geometry, Botany, Zoology, Latin, Greek, etc.

**For further information and announcement, apply to**

**L. L. DUNBAR, Dean,**
**606 Sutter Street,**
**SAN FRANCISCO.**

**Or the College of Dentistry, 1170 Market Street.**

# Northwestern University
# Dental School.

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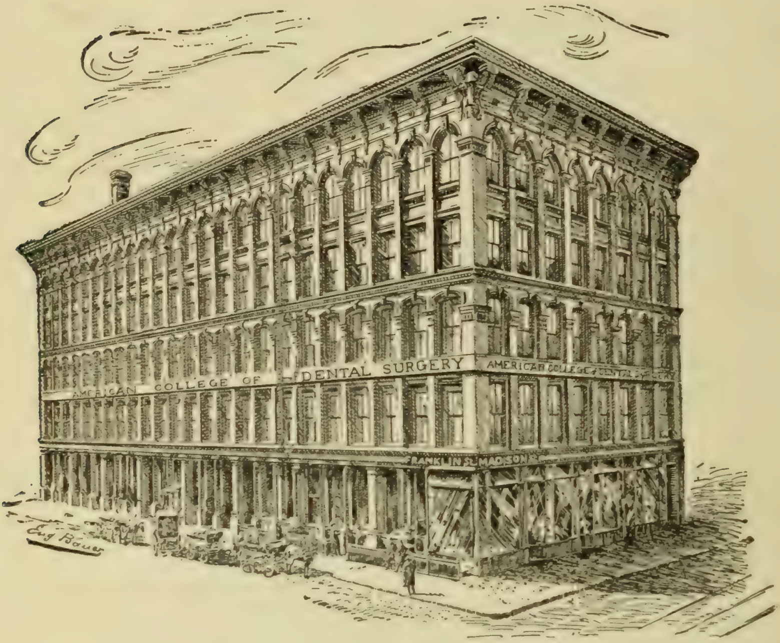
The American College of Dental Surgery has been consolidated with this School.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DENTAL DEPARTMENT

OF THE

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The session of 1898-99 begins in September, 1898, and ends in April, 1899. Three terms of six months each are required before graduation.

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| Fees first year | $105.00 |
| Each succeeding year | 100.00 |

For further information, address

Dr. Y. H. BOND, Dean,
Grand and Page Avenues, St. Louis.

Dr. J. H. KENNERLY, Secretary,
905 Chemical Building, St. Louis.

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# BIRMINGHAM DENTAL COLLEGE,

## BIRMINGHAM, ALA.

**Session 1898-99.** The regular Winter Session will begin October 1, 1898, and continue until April 1, 1899.

ALL THE BRANCHES APPERTAINING TO

## DENTAL SCIENCE AND ART

ARE THOROUGHLY TAUGHT.

**THIS COLLEGE IS A MEMBER OF THE NATIONAL ASSOCIATION OF DENTAL FACULTIES.**

For Catalogues and other information, address

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H. W. ARTHUR, D.D.S., Professor of Operative Dentistry and Technics.
G. L. SIMPSON, D.D.S., Professor of Dental Pathology and Electro-Therapeutics.
WALTER H. FUNDENBERG, D.D.S., Professor of Prosthetic Dentistry and Orthodontia.
STEWART L. McCURDY, A.M., M.D., Professor of Anatomy, General and Oral Surgery.
J. H. BEAL, Sc.D., PH.G., Professor of Chemistry, Metallurgy, and Microscopy.
THEODORE DILLER, M.D., Professor of Physiology.
GEO. R. SHIDLE, D.D.S., Professor of Principles of Oral Surgery and Anesthesia.

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WALTER M. LINDSAY, A.B., Lecturer on Jurisprudence.

### DEMONSTRATORS.

WALTER C. ARTHUR, M.D., D.D.S., Operative Dentistry and Operative Technics.
J. F. THOMPSON, D.D.S., Prosthetic Dentistry.
O. L. HERTIG, D.D.S., Operative Dentistry.
CLEMENT R. JONES, M.D., Anatomy.

### CLINICAL INSTRUCTORS.

Dr. J. S. KING,
Dr. GALE FRENCH,
Dr. T. H. WHITESIDES,
Dr. WM. VANANTWERP,
Dr. H. L. REINECKE,
Dr. A. C. McALPIN,
Dr. GEO. W. MELOTTE,
Dr. H. H. HARRISON,
Dr. GEO. CULBERTSON,
Dr. G. W. GREEN,
Dr. W. E. VANORSDEL,
Dr. L. W. BALLARD.

This College has accepted the requirements of the National Association of Dental Faculties. All students admitted and graduated will be under these rules.

The College possesses means for thorough training theoretically and practically in all branches of dentistry.

The building, which is new, contains all modern conveniences. There are three floors with over ten thousand square feet of floor space, and over sixteen hundred square feet of window space.

The Spring Course commences April 13. The fee charged for this course will be credited upon the fee for the regular session.

The Fall Course will commence September 10, and will be free to those matriculating for the regular session.

The Regular Session will commence October 1.

FEES.

| | |
|---|---|
| Matriculation, paid but once | $5.00 |
| Tuition fee | 100.00 |
| Dissecting fee | 10.00 |
| Diploma fee | 30.00 |

For further information, address

**Dr. J. G. TEMPLETON, Dean Dental Department,**
**435 Penn Avenue, Pittsburg, Pa.**

# New York College of Dentistry.

Incorporated by the Legislature of the State of New York in 1865.

## Thirty-Third Collegiate Year.

The collegiate year work of 1898-99 will consist of a FREE Infirmary Course (OPTIONAL) to matriculated students for the collegiate year, from May 16, 1898, to October 2, 1898, of daily infirmary practice, and a Lecture Session (OBLIGATORY) from October 4, 1898, to May 15, 1899.

A special feature of the curriculum of the New York College of Dentistry is that her students work DAILY in the Infirmary for the entire period of their college attendance—first, second, and third years—under the direction of the superintendents and demonstrators.

## Registration for the Lecture Session of 1898-99 closes October 12, 1898.

Applicants will be admitted to the lecture session of 1898-99 as Degree, Special, or Session Students.

### 1. DEGREE STUDENTS.

Those matriculating toward the degree of the college under the following preliminary educational requirements:

a. Of those who were matriculated in a registered dental or medical college prior to January 1, 1896, no preliminary educational conditions will be required, other than that of a grammar school, either for the degree of the college or the license examination of the state of New York.

b. Of those who were matriculated in a registered dental or medical college between January 1, 1896, and January 1, 1897, twenty-four academic counts of the State of New York or their equivalent will be required to obtain the "Dental Student Certificate."

**c. Of those who matriculated since January 1, 1897, 36 academic counts of the State of New York or their equivalent will be required to obtain the "Dental Student Certificate."**

### 2. SPECIAL STUDENTS.

Those who, without any preliminary educational requirements, other than that of a grammar school, matriculate, but not toward the degree, attend college FREE pending their securing the preliminary educational requirements to become a degree student, with their special student period credited as pupilage only. On the date of their being entitled thereto they may become "Degree Students."

### 3. SESSION STUDENTS.

Those who, without any preliminary educational requirements other than that of a grammar school, matriculate for their first or second lecture session, but not toward the degree, pay the fees and are eligible to the examinations and certificate of the session, which certificate will admit them to advanced standing toward the degree in dental colleges belonging to the National Association of Dental Faculties.

**A graduate of a dental college of the State of New York is not admitted to the dental license examination of the State of New York unless he has fulfilled the preliminary educational requirements of "Degree Students" as stated above.**

For full details of the college send for an announcement of 1898-99 and a copy of "Form I," addressing

FANEUIL D. WEISSE, M.D., Dean,
205-207 East 23d Street,
NEW YORK, N. Y.

# The Baltimore College of Dental Surgery.

*Chartered by the Legislature of Maryland in 1839.*

## THE OLDEST DENTAL COLLEGE IN THE WORLD.

### FACULTY.

M. WHILLDIN FOSTER, M.D., D.D.S., Professor of Therapeutics and Pathology.
WM. B. FINNEY, D.D.S., Professor of Dental Mechanism and Metallurgy.
B. HOLLY SMITH, M.D., D.D.S., Professor of Dental Surgery and Operative Dentistry.
THOMAS S. LATIMER, M.D., Professor of Physiology.
WILLIAM SIMON, M.D., PH.D., Professor of Chemistry.
CHARLES F. BEVAN, M.D., Clinical Professor of Oral Surgery.
J. W. CHAMBERS, M.D., Professor of Anatomy.
GEORGE H. ROHE, M.D., Professor of Materia Medica.

### LECTURERS.

WM. F. SMITH, A.B., M.D., Regional Anatomy.
R. BAYLY WINDER, Phar. G., D.D.S., Materia Medica.
EDW. HOFFMEISTER, PH.G., D.D.S., Materia Medica.
J. N. FARRAR, M.D., D.D.S., Irregularities.
J. MEYER, D.D.S., Continuous-Gum.
DR. GEORGE EVANS, Crown- and Bridge-Work.
DR. K. C. GIBSON, Artificial Palates and Fractured Maxillaries.

### CLINICAL INSTRUCTORS.

T. S. WATERS, D.D.S., Chief Clinical Instructor, Resident.

| | | | |
|---|---|---|---|
| CORYDON PALMER, D.D.S. | Ohio. | C. M. GINGRICH, D.D.S., Res. | Md. |
| E. PARMLY BROWN, D.D.S. | N. Y. | JOHN ALLEN, D.D.S. | N. Y. |
| A. L. NORTHROP, D.D.S. | N. Y. | R. B. DONALDSON. D.D.S. | D. C. |
| CHAS. R. BUTLER, D.D.S. | Ohio. | H. A. PARR, D.D.S. | N. Y. |
| E. L. HUNTER, D.D.S. | N. C. | J. EMORY SCOTT, D.D.S. | Md. |
| W. W. WALKER, D.D.S. | N. Y. | E. R. RUST, D.D.S. | D. C. |
| T. S. WATERS, D.D.S. | Md. | C. L. ALEXANDER, D.D.S. | N. C. |
| F. C. BARLOW, D.D.S. | N. J. | C. A. MEEKER, D.D.S. | N. J. |
| GEO. E. ADAMS, D.D.S. | N. J. | G. M. SMITH, D.D.S. | Md. |
| OSCAR C. ADELBERG, D.D.S. | N. J. | M. M. MAINE, D.D.S. | Conn. |

### DEMONSTRATORS.

W. G. FOSTER, D.D.S., Demonstrator of Operative Dentistry.
GEORGE E. HARDY, M.D., D.D.S., Demonstrator of Mechanical Dentistry.
EDW. HOFFMEISTER, PH.G., D.D.S., Demonstrator of Chemistry.

### ASSISTANT DEMONSTRATORS.

W. W. DUNBRACCO, D.D.S.
R. O. SADLER, D.D.S.
C. H. CARSON, D.D.S.
J. K. BURGESS, D.D.S.
J. S. SUTHERLAND, D.D.S.
GEO. MILHOLLAND, D.D.S.
L. M. PARSONS, D.D.S.

FRANK DYER SANGER, M.D., Demonstrator of Anatomy.
H. H. HAYDEN, M.D., Assistant Demonstrator of Anatomy.
CHARLES F. BLAKE, M.D., Assistant Demonstrator of Anatomy.

The Baltimore College of Dental Surgery, the first and for many years the only dental school, offers facilities for the study of dentistry proper, such as age and experience only can give. Its immense museum, complete apparatus, large and well-arranged building, and carefully studied curriculum give to its students great advantages and opportunities, both theoretical and practical, while its age gives its diploma a dignity far outranking all other colleges—a diploma honorably represented in all civilized countries, and held by the most distinguished members of the dental profession.

The fact that dentistry must be practically taught is fully recognized, the College Infirmary, a most complete, large, and handsome hall, being daily filled with clean and respectable patients, of a class nearly equal to those of the average dentist. The Infirmary is open all the year, students paying an entrance fee, which is deducted from those of the regular succeeding course.

The session begins October 1, closing in April. A large corps of demonstrators, always present, put in actual practice the teachings of all lecturers in dentistry—leaving nothing undemonstrated. All methods are fully taught, all appliances and apparatus used; the making of instruments and the most elaborate gold and continuous-gum work, and all the cases arising in ordinary practice, with many which are rarely seen, carefully demonstrated.

Commencing October 1, 1895, women will be admitted to this College, subject to the same requirements as men.

The College has formed an alliance with the College of Physicians and Surgeons by which its students are privileged to attend all lectures and clinics. The patients of this medical school numbered last year over 40,000.

Graduates of the Baltimore College of Dental Surgery are required to attend but one session at the College of Physicians and Surgeons prior to presenting themselves as candidates for the degree of M.D. (See Catalogue.) In accordance with the resolutions adopted by the National Association of Dental Faculties, which go into effect for the session of 1891 and 1892, the qualifications for entering the first year's course are a preliminary examination in the ordinary English branches.

**TERMS OF GRADUATION.**—Attendance on three winter courses of lectures in this College; as equivalent to one of these we accept one course in any reputable dental college. Graduates in Medicine can enter the Junior Class.

**BENEFICIARY STUDENTS.**—Each State Dental Society is privileged to send one Beneficiary Student to this College at one-half the regular fees. This has been for some years an established feature of this College.

**FEES.**—Matriculation (paid only once), $5.00. Tuition fee, $100.00. Diploma fee, $30.00. Dissecting fee, $10.00.

Students corresponding with the Dean will please be careful to give full address, and direct their letters to

**M. W. FOSTER, M.D., D.D.S., Dean, No. 9 W. Franklin St., Baltimore, Md.**

# Vanderbilt University,

## Department of Dentistry.

Nashville, Tenn.

THE 20th SESSION

Will commence October 3d, 1898, and continue to the last week in March, 1899. Lectures, recitations, and demonstrations constitute the work of the graded courses. For further information address

**Dr. W. H. MORGAN, Dean,**
211 NORTH HIGH ST.

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# New York Dental School,

An Institution of the

## UNIVERSITY OF THE STATE OF NEW YORK.

289 Fourth Avenue, New York.
CO-EDUCATIONAL.

The Session of 1897-98 begins October 5.

Candidates for the degree of Doctor of Dental Surgery are required to attend three annual courses of seven months each.

These courses include didactic lectures, clinics, laboratory work, and infirmary practice.

### IMPORTANT CHANGES IN REGENTS' REQUIREMENTS.

Students who have completed partial courses in academic institutions may receive credit for the same towards academic equivalent dental student certificates.

Students who matriculate prior to January 1, 1900, in registered dental schools may gain dental student certificates on a 36 academic count basis.

Only 24 academic counts, or their equivalent, are required to matriculate in dentistry; the other 12 academic counts must be earned during the first year of professional study.

**Many students who have abandoned the idea of entering a dental school, or those who have planned not to enter until 1899, may now find it possible to enter this fall.**

For Announcement and other information, address

DWIGHT L. HUBBARD, M.D., Dean,
117 West 93d Street, New York City.

# Baltimore

# Medical College.

# Dental Department.

**Member National Association of Dental Faculties.**

FACULTY.

J. W. SMITH, D.D.S., Dean,
*Professor of Dental Prosthesis, Metallurgy, Crown- and Bridge-Work.*

J. E. ORRISON, D.D.S.,
*Professor Operative Dentistry, Dental Science, and Dental Technique.*

WM. A. MONTELL, D.D.S.,
*Professor Dental Pathology, Dental Therapeutics, and Dental Materia Medica.*

A. C. POLE, M.D.,
*Professor Anatomy.*

J. D. BLAKE, M.D.,
*Professor Operative, Clinical, and Oral Surgery.*

SAMUEL T. EARLE, M.D.,
*Professor Physiology.*

J. FRANK CROUCH, M.D.,
*Professor Materia Medica and Therapeutics.*

W. B. D. PENNIMAN, Ph.D.,
*Professor Chemistry.*

LECTURERS.

Tilghman B. Marden, A.B., M.D.,
*Histology.*

A. Lee Browne, A.B.,
*Chemistry.*

Walton Bolgiano, A.B., M.D.,
*Anatomy.*

W. P. Miller, A.M., M.D.,
*Pathology.*

S. C. Pennington,
*Nitrous Oxid Gas.*

Wm. A. Mills, D.D.S.

DEMONSTRATORS.

KENNON W. EGERTON, D.D.S.,
*Demonstrator in Operative Dentistry.*

E. E. CRUZEN, D.D.S.,
*Demonstrator in Prosthetic Dentistry, Crown- and Bridge-Work.*

TEN ASSISTANT DEMONSTRATORS.

The regular course begins on Wednesday, October 5, 1898, and closes April 5, 1899. New commodious buildings. New special equipment. Abundant Clinic. Board, light, and heat, $2.50 to $3.50 per week.

Send for announcement. Address J. W. SMITH, D.D.S., Dean,
**712 N. Eutaw Street, Baltimore.**

# University of Buffalo—Dental Department.

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The Seventh Annual Session will open September 13, 1898, and continue for thirty weeks.

All the lectures and instruction will be given in its own new and complete building, erected for its exclusive use.

The course is a full graded one, each class receiving its instruction by separate lectures and in separate laboratories.

There are three prosthetic laboratories on separate floors, with a full technic course in operative and mechanical work in its own room.

The Infirmary affords more material for practical work than can be utilized, it being frequently necessary to turn patients away.

The Summer Term is open for matriculates without extra expense, the annual fee of $100 being payment for the full year.

Special attention is given in the last part of each term to the preparation of senior students for state examinations.

Senior students attend the clinics in Oral Surgery given by members of the Faculty at the Buffalo General and the Fitch Accident Hospitals.

There are Chemical, Histological, Bacteriological, and Pathological Laboratories, each fully equipped with the latest apparatus, and thorough instruction is given by didactic and laboratory courses.

There is in the Museum a very complete collection of skeletons and skulls, scientifically and serially arranged and representing all the classes and orders of animal life, which is used for illustrating the couse of lectures in Comparative Dental Anatomy that is each year given.

Students are received for instruction under the qualifications of the National Association of Dental Faculties. They can graduate and become eligible for examination for practice in the state of New York only upon obtaining the qualifications of the State Board of Regents. This is the completion of the work of a three years' high school course before graduation.

The annual announcement and any further information can be obtained by addressing

**University of Buffalo—Dental Department,**
**Goodrich Street, Buffalo, N. Y.**

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# COLUMBIAN UNIVERSITY,

## DENTAL DEPARTMENT.

1325 H Street, Northwest, Washington, D. C.

### FACULTY.

B. L. WHITMAN, D.D., President of the Columbian University.
J. HALL LEWIS, D.D.S., Professor of Dental Prosthetics.
HENRY C. THOMPSON, D.D.S., Professor of Operative Dentistry.
E. A. DE SCHWEINITZ, PH.D., Professor of Chemistry.
WM. P. CARR, M.D., Professor of Physiology.
D. P. PRENTISS, A.M., M.D., Professor of Materia Medica.
D. K. SHUTE, A.B., M.D., Professor of Anatomy.
J. R. HAGAN, D.D.S., Professor of Oral Surgery.

The Regular or Winter Session begins about the first of October and ends April 30.

The Infirmary opens October 1 and closes July 1.

### FEES.

| | |
|---|---|
| Annual Tuition Fee | $100 |

**There are no other Charges or Extras of any kind whatever.**

For further information, address

J. HALL LEWIS, D.D.S., Dean,
**1023 Vermont Avenue, N. W., Washington, D. C.**

ESTABLISHED 1845.

# Ohio College of Dental Surgery.

## DEPARTMENT OF DENTISTRY—UNIVERSITY OF CINCINNATI.

## SESSION 1898-99.

### FACULTY.

J. S. CASSIDY, A.M., M.D., D.D.S., Professor of Chemistry and Materia Medica.
H. A. SMITH, A.M., D.D.S., DEAN OF THE FACULTY, Professor of Operative Dentistry and Dental Pathology.
C. M. WRIGHT, A.M., D.D.S., Professor of Physiological and General Pathology.
WM. KNIGHT, M.D., D.D.S., Professor of Anatomy and Oral Surgery.
GRANT MOLYNEAUX, D.D.S., Professor of Prosthetic Dentistry and Metallurgy.
H. T. SMITH, D.D.S., Professor of Clinical Operative Dentistry.

J. TAFT, M.D., D.D.S., Lecturer on Oral Hygiene.
C. I. KEELY, D.D.S., Lecturer on Orthodontia.
L. E. CUSTER, D.D.S., LLecturer on Anesthetics and Dental Electricity.
O. L. CAMERON, Lecturer on Bacteriology.

### DEMONSTRATORS.

T. I. WAY, D.D.S., Superintendent of the Clinic and of Instruction in Operative Technics.
E. A. MEHAFFEY, D.D.S., Demonstrator of Crown- and Bridge-Work and Operative Dentistry.
C. P. McLAUGHLIN, D.D.S., Demonstrator of Operative Dentistry and Instructor in Extraction of Teeth.
L. T. IVINS, D.D.S., Demonstrator of Prosthetic Dentistry and Instructor in Prosthetic Technics.
H. C. MATLACK, D.D.S., Demonstrator of Anatomy.
W. S. LOCKE, D.D.S., Demonstrator of Clinical Orthodontia.
DAVID STERN, B.S., D.D.S., Demonstrator of Analytical Chemistry.

The Fifty-third Annual Session begins October 12, 1898, and closes April 12, 1899.
A Spring Course of Clinical Instruction begins April 17, 1899.
A Fall Course of Clinical Instruction begins September 1, 1899.
Fees: Matriculation Fee (payable but once), $5.00; Professors' Tickets for each year (including all Clinical and Laboratory Courses), $100.00; Diploma Fee, $25.00.

For further information and announcement, address

H. A. SMITH, D.D.S., Dean,
or H. T. SMITH, D.D.S., Secretary,
116 Garfield Place, CINCINNATI, O.

# Harvard University, Dental Department.

## BOSTON, MASS., 1898-99.

### FACULTY.

CHARLES W. ELIOT, LL.D., President.
EUGENE H. SMITH, D.M.D., Dean, and Professor of Mechanical Dentistry and Orthodontia.
J. COLLINS WARREN, M.D., Professor of Surgery.
HENRY P. BOWDITCH, M.D., Professor of Physiology.
THOMAS DWIGHT, M.D., Professor of Anatomy.
THOMAS FILLEBROWN, M.D., D.M.D., Professor of Operative Dentistry and Oral Surgery.
WILLIAM B. HILLS, M.D., Assistant Professor of Chemistry.
CHARLES MINOT, M.D., Professor of Histology.
HAROLD C. ERNST, M.D., Professor of Bacteriology.
CHARLES A. BRACKETT, D.M.D., Professor of Dental Pathology.
EDWARD C. BRIGGS, M.D., D.M.D., Professor of Materia Medica and Therapeutics.
JERE E. STANTON, M.D., D.M.D., Assistant Professor in Oral Anatomy, Physiology, and Bacteriology.
WILLIAM P. COOKE, D.M.D., Instructor in Crown- and Bridge-Work, and in Metallurgy.
FRANKLIN DEXTER, M.D., Assistant Professor of Anatomy.
WILLIAM H. POTTER, D.M.D., Lecturer in Operative Dentistry.

### OTHER INSTRUCTORS.

FOREST G. EDDY, D.M.D., Instructor in Operative Dentistry.
GEORGE H. MONKS, M.D., Instructor in Surgical Pathology.
EDWARD W. TAYLOR, M.D., Instructor in Neurology.
EZRA F. TAFT, D.M.D.. Instructor in Operative Dentistry.
JULIUS G. W. WERNER, D.M.D., Clinical Instructor in Operative Dentistry.
DWIGHT M. CLAPP, D.M.D., Clinical Lecturer in Operative Dentistry.
EDWIN C. BLAISDELL, D.M.D., Instructor in Operative Dentistry.
WALDO E. BOARDMAN, D.M.D., Instructor in Operative Dentistry, Curator of Museum, and Librarian.
FREDERICK BRADLEY, D.M.D., Instructor in Operative Dentistry.
HENRY L. UPHAM, D.M.D., Instructor in Operative Dentistry.
ARTHUR H. STODDARD, D.M.D., Clinical Lecturer in Mechanical Dentistry.
PATRICK W. MORIARTY, D.M.D., Demonstrator of Mechanical Dentistry, and Instructor in the Mechanical Treatment of Fractured Jaws and Cleft Palates.
HARRY O. BIXBY, D.M.D., Instructor in Mechanical Dentistry.
ARTHUR W. ELDRED, D.M.D., Instructor in Mechanical Dentistry.
JOSEPH T. PAUL, D.M.D., Demonstrator of Operative Dentistry.
NATHAN P. WYLLIE, D.M.D., Instructor in Materia Medica and Anesthesia.
ALLEN S. BURNHAM, D.M.D., Instructor in Mechanical Dentistry.
THOMAS B. HAYDEN, D.M.D., Instructor in Mechanical Dentistry.
WALTER H. WHITE, D.M.D., Assistant Demonstrator of Operative Dentistry.
DWIGHT WARD DICKINSON, D.M.D., Instructor in Operative Dentistry.
EDWIN L. FARRINGTON, D.M.D., Assistant Demonstrator of Operative Dentistry.
ROBERT J. McMEEKIN, D.M.D., Assistant Demonstrator of Mechanical Dentistry.
ASHER H. St.C. CHASE, D.M.D., Instructor in Mechanical Dentistry.
HARRY W. HALEY, D.M.D., Instructor in Mechanical Dentistry.
HAROLD DeWITT CROSS, D.M.D., Instructor in Mechanical Dentistry.
NEWTON S. BACON, A.B., Instructor in Chemistry.
DICKINSON JOHN DANA, D.M.D., Clinical Instructor in Mechanical Dentistry.

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The Thirtieth Annual Session of this school begins September 29, 1898, and ends June 28, 1899, with a recess of one week at Christmas, and another in April, making a school-year of nine months of practically continuous work.

General Anatomy, Physiology, General Chemistry, Hygiene, Histology and Embryology, and Bacteriology, together with ample dissecting under able demonstrators, are the studies of the first year, and are identical with those of the Harvard Medical School. The studies for the second year are Operative and Mechanical Dentistry and Orthodontia, Crown- and Bridge-Work and Metallurgy, Materica Medica and Therapeutics, Oral Anatomy and Physiology, and Bacteriology, Dental Pathology, and Oral Surgery. Of the third year the studies are Operative and Mechanical Dentistry and Orthodontia, Crown- and Bridge-Work, and Metallurgy, Neurology and Surgical Pathology and Surgery. Attention is called to the fact that TWENTY-SEVEN MONTHS of progressive instruction compose the required three years in the school.

All applicants for advanced standing must pass the examination of the years they desire to omit, or furnish proof that they have passed EQUIVALENT examinations.

At the end of each year written and oral examinations test the student's knowledge, and he must pass satisfactorily in a majority of the studies of each year before he can pass on to the next year's class.

To those wishing to take the medical degree the studies taken in the first year of this school are allowed in the Medical School of the University, after passing the required entrance examinations.

The University Degree, D.M.D. (Dentariæ Medicinæ Doctor), is conferred upon all who fulfill the requirements.

Graduates of recognized dental schools will be admitted to the course of Operative and Mechanical Dentistry on payment of $50 each, or $100 for both, for the whole or any portion of the academic year.

### FEES.

There are no fees for matriculation, nor for the diploma, nor for the demonstrators. For the first year the student is a member of the school the fee is $200, payable in two instalments of $120 and $80; for the second year, $150, in two payments of $100 and $50; for the third year, $150, in two payments of $100 and $50. For any subsequent year, $50, payable at the beginning of the year. For information and announcements, address

**EUGENE H. SMITH, Dean, 283 Dartmouth St., Boston, Mass.**

# UNIVERSITY OF PENNSYLVANIA,

## DEPARTMENT OF DENTISTRY.

### FACULTY.

CHARLES C. HARRISON, LL.D., Provost, and *ex-officio* President.
REV. GEORGE S. FULLERTON, PH.D., Vice-Provost.

CHARLES J. ESSIG, M.D., D.D.S., Professor of Mechanical Dentistry and Metallurgy.
EDWIN T. DARBY, M.D., D.D.S., Professor of Operative Dentistry and Dental Histology.
JAMES TRUMAN, D.D.S., Professor of Dental Pathology, Therapeutics, and Materia Medica.
EDWARD C. KIRK, D.D.S., Professor of Clinical Dentistry.
EDWARD T. REICHERT, M.D., Professor of Physiology.
GEORGE A. PIERSOL, M.D., Professor of Anatomy.
JOHN MARSHALL, M.D., NAT. SC.D., Professor of Chemistry.

MATTHEW H. CRYER, M.D., D.D.S., Assistant Professor of Oral Surgery.
GEORGE G. MILLIKEN, M.D., D.D.S., Assistant Professor of Operative Technics.

ROBERT HUEY, D.D.S., Lecturer on Operative Dentistry.
JOHN THOMAS, D.D.S., Lecturer on Nitrous Oxid.
NORMAN STURGES ESSIG, D.D.S., Lecturer on Mechanical Dentistry.
MEYER L. RHEIN, M.D., D.D.S., Lecturer on Dental Pathology.
SAFFORD G. PERRY, D.D.S., Lecturer on Operative Dentistry.
FREDERICK A. PEESO, D.D.S., Lecturer on Crown- and Bridge-Work.

### CLINICAL INSTRUCTORS.

DR. C. S. BECK,
DR. W. G. A. BONWILL,
DR. W. R. MILLARD,
DR. D. N. McQUILLEN,
DR. E. H. NEALL,
DR. H. C. REGISTER,
DR. GEO. W. KLUMP,
DR. EDW. I. KEFFER,
DR. R. R. UNDERWOOD,
DR. I. F. WARDELL,
DR. JOHN R. YORKS.

### DEMONSTRATORS.

#### Operative Dentistry.

WILLIAM DIEHL, D.D.S., Chief Demonstrator.

*Assistants.*

JOSEPH W. WHITE, D.D.S.
JAMES E. LODER, D.D.S.
WILSON ZERFING, D.D.S.
R. HAMILL D. SWING, D.D.S.
NEWTON C. HASSELL, D.D.S.
WM. C. MARSH, D.D.S.

#### Mechanical Dentistry.

JAMES G. LANE, D.D.S., Chief.
FREDERICK W. AMEND, JR., D.D.S.
A. SWANTON BURKE, D.D.S.
JAMES A. DOWDEN, D.D.S.
HARRY B. HICKMAN, D.D.S.
MILTON N. KEIM, JR., D.D.S.
ROBERT J. SEYMOUR, D.D.S.

#### Crown- and Bridge-Work.

J. E. DUNWOODY, D.D.S., Chief.
JOS. M. HILL, D.D.S.
AMBLER TEES, Demonstrator Continuous-Gum Work.

#### Normal Histology.

ROBERT FORMAD, M.D.
GEO. H. CHAMBERS, M.D.
GEO. C. STOUT, M.D.

#### Chemistry.

DANIEL W. FETTEROLF, M.D.

#### Anatomy.

EDMUND W. HOLMES, M.D.

#### Osteology

RICHARD H. HARTE, M.D.

### CONDITIONS OF ADMISSION.

Candidates for admission are required to present evidence of a preliminary education as follows:

For the session of 1898-99 a certificate of high school entrance; for the session of 1899-1900 a certificate of two years' high school attendance; for the session of 1900-01 a diploma of an approved high school having a three-years' course or certificate showing three years' attendance at a high school having a four-years' course, or certificates from other schools showing equivalent education. In lieu of such diploma or certificates, the applicant will be required to pass a matriculate examination which will in each case be the equivalent of that forming the basis of the certificates of required preliminary education.

N. B.—Special attention is called to the rule adopted by the National Association of Dental Faculties, August, 1895, requiring all applicants for matriculation to be present and enter their names not later than the tenth of October. This rule applies equally to students entering the second and third year classes.

### FEES.

| | | | |
|---|---|---|---|
| Matriculation Fee (paid once only)... | $5.00 | Dissecting Fee (Second Year)........ | $10.00 |
| Fee for One Course of Lectures...... | 100.00 | Graduation Fee (Third Year)......... | 30.00 |

Board can be obtained at from five to eight dollars per week, according to location and accommodations.

# University of Pennsylvania.—Dental Department.

The Dental Department enters upon the present session in "Dental Hall," the new building especially erected for its use. The facilities thus afforded are, it is believed, unequalled for securing an education complete in all departments of dental science, and art. The clinical operating room is 180 by 50 feet, lighted on all sides, and furnished with 100 Wilkerson Chairs of latest pattern, especially constructed for the Department. Each operating chair has a fountain spittoon attached, also especially designed and constructed for this Department. Electrical service is supplied to all of the chairs, and is of a character to cover all of the applications of electricity to dentistry. The Prosthetic Department is supplied with laboratory facilities devoted to every branch of the work. Prosthetic technic, in vulcanite and metal work, porcelain work, continuous-gum work, and crown- and bridge-work, is taught by modern methods in separate laboratories especially equipped for the purpose. The laboratories are furnished with power lathes and with compressed-air apparatus for soldering and metallurgical operations.

The clinical patronage of the Department is always in excess of the needs of the students.

Oral surgical clinics, also general surgical clinics, are held twice a week.

Practical instruction in Chemistry, Histology, and Bacteriology is given in appropriately equipped laboratories.

The Dissecting-Room is large, well lighted, thoroughly ventilated, and is furnished with ample material for the successful prosecution of anatomical studies.

The technic or manual training method of imparting instruction is developed in relation to all departments where it has been found applicable.

All of the departments of practical laboratory and clinical instruction are in charge of competent and experienced demonstrators, who are ably assisted in the work of instruction by a full corps of expert assistants.

The Dental Department of the University is an integral part of the University system. Its students are eligible to and participate in all those features of University life common to the whole student body of the institution. These include its athletic features and privileges of the Howard Houston Hall, the club house of an organization governed by the University students and having all of the appointments and desirable features of a strictly first-class club. The dormitories of the University are the best of their kind in this country, and to these the students of dentistry are admitted in common with the students of all the other departments.

## THE REGULAR OR WINTER SESSION.

The session begins October 1, and ends at Commencement, early in June. The number of lectures per week, with a synopsis of the various branches taught, will be found in the General Catalogue.

In order to facilitate work in the practical departments, the regular winter session is so arranged that the first-course student is required to divide the morning hours equally between DENTAL TECHNICS, HISTOLOGICAL, AND CHEMICAL LABORATORY WORK.

During the second and third years the student has the entire forenoon of each day for practical dental work. Ample opportunity is thus afforded for practice in operative and prosthetic dentistry. The first-year classes are divided into sections, the time not otherwise engaged being devoted to practice in the operative and mechanical rooms.

This plan of GRADING THE COURSE, and of affording the first and second year students an opportunity of coming forward for examination in certain branches, not only proves an economical arrangement of their time, but greatly facilitates their labors in the acquirement of knowledge in the remaining branches.

## PLAN OF EXAMINATIONS.

Attendance upon three regular courses of lectures will be required before the student can take the final examination for the degree of Doctor of Dental Surgery.

At the close of the first year, final examinations are held in CHEMISTRY AND MATERIA MEDICA, ELEMENTARY ANATOMY, HISTOLOGY, OSTEOLOGY, and MYOLOGY, and in PHYSIOLOGY, excepting the Muscular and Nervous Systems. At the end of the second year the student is examined finally upon ANATOMY and PHYSIOLOGY; and progress in OPERATIVE AND MECHANICAL DENTISTRY; if he is not qualified, a second examination is afforded him at the beginning of the next winter session.

The final examination at the close of the third year is in OPERATIVE DENTISTRY, MECHANICAL DENTISTRY, METALLURGY, BACTERIOLOGY, CLINICAL DENTISTRY, DENTAL PATHOLOGY AND THERAPEUTICS, AND ORAL SURGERY.

All applicants for advanced standing must pass the required examinations of this school, or furnish proof that they have passed EQUIVALENT examinations in some recognized dental or medical school. Graduates of a recognized medical college will be admitted to the second-year class without examination.

For detailed information and announcements, address

EDWARD C. KIRK, D.D.S.,
*Dean of the Dental Faculty,*
**Dental Hall, Cor. 33d and Locust Sts.,**
PHILADELPHIA, PA.

# Chicago College of Dental Surgery

## Dental Department of Lake Forest University.

The Annual Winter Course of Instruction will begin October 5, 1898, and end April 5, 1899.

Three full winter courses of lectures are required before graduation. Graduates of pharmaceutical and undergraduates of medical colleges in good standing and graduates of reputable veterinary colleges are admitted to the second year course, and can become candidates for graduation after taking two full winter courses of instruction.

## FACULTY.

J. G. K. McCLURE, D.D., President of the University.

NICHOLAS SENN, M.D., PH.D., LL.D., Consulting Surgeon.

TRUMAN W. BROPHY, M.D., D.D.S., LL.D., Dean, Professor of Oral Surgery, 126 State street, Champlain Building, Chicago.

W. L. COPELAND, M.D., C.M., M.R.C.S., Professor of Anatomy, 866 West Monroe street, Chicago.

W. T. BELFIELD, M.D., Professor of Principles of Surgery, 112 Clark street, Chicago.

FRANK H. GARDINER, M.D., D.D.S., Clinical Professor of Operative Dentistry, Marshall Field Building, Chicago.

C. N. JOHNSON, L.D.S., D.D.S., A.M., Professor of Operative Dentistry, Marshall Field Building, Chicago.

W. C. BARRETT, M.D., D.D.S., Professor of Dental Anatomy and Pathology. Residence, Buffalo, N. Y.

L. L. SKELTON, A.M., M.D., Professor of Physiology, 70 State street, Chicago.

CALVIN S. CASE, M.D., D.D.S., Professor of Orthodontia, Stewart Building, Chicago.

A. W. HARLAN, A.M., M.D., D.D.S., Professor of Materia Medica and Therapeutics, Masonic Temple, Chicago.

J. NEWTON ROE, A.M., Sc.D., Professor of Chemistry and Metallurgy, Valparaiso, Indiana.

E. J. PERRY, D.D.S., Professor of Prosthetic Dentistry, Stewart Building, Chicago.

Fees good until April 1, 1898.

### FRESHMAN YEAR, 1898-99.

| | |
|---|---|
| Matriculation fee | $5.00 |
| General ticket | 100.00 |
| Histological laboratory ticket | 5.00 |
| Dissection fee (one part) | 10.00 |
| | $120.00 |

### JUNIOR YEAR, 1898-99.

| | |
|---|---|
| Matriculation fee | $5.00 |
| General ticket | 100.00 |
| Histological laboratory ticket | 5.00 |
| Dissection fee (one part) | 10.00 |
| | $120.00 |

### SENIOR YEAR, 1898-99.

| | |
|---|---|
| Matriculation fee | $5.00 |
| General ticket | 100.00 |
| Bacteriological laboratory tickets | 5.00 |
| | $110.00 |

Senior students who take dissecting will be required to pay the fee for same.

A fee of $5.00 must be deposited to cover chemicals and breakage in the Chemical Laboratory.

Letters of inquiry should be addressed to

**Dr. TRUMAN W. BROPHY, Dean, 126 State Street, Chicago, Ill.**

# Chicago College of Dental Surgery

DENTAL DEPARTMENT OF LAKE FOREST UNIVERSITY.

CHICAGO COLLEGE OF DENTAL SURGERY
CHICAGO DENTAL COLLEGE SURGERY
BENEDICT & CO CHI.

**COLLEGE BUILDING.**
S. E. Cor. Wood and Harrison Streets.

The new college building occupies a prominent position among a group of fifteen others, comprising medical colleges, hospitals, and schools.

The building has a frontage of eighty-five feet, and a depth of one hundred and twenty feet. It is a five-story and basement structure, the basement and first story being of rock-faced Bedford stone, and the superstructure of pressed brick and terra-cotta, with terra-cotta trimmings.

The building has two entrances, the main one through a large cut-stone doorwav surmounted by a stone arch beautifully ornamented with carved work. The interior is finished in hard wood, according to the latest idea of elegance, convenience, and comfort.

The entire six floors of the building are divided into lecture rooms, class rooms, clinic rooms, etc., with the exception of the second floor, which is devoted to the Dental Infirmary. The chief lecture room has a seating capacity of four hundred and fifty students. There is also a dissecting room, thoroughly equipped with all the requisites for the study of human anatomy.

There are Histological, Chemical, Bacteriological Laboratories, also Laboratories for the study of Operative and Prosthetic Technics, and one for the construction of artificial dentures.

The building occupied by the Chicago College of Dental Surgery is, in all its appointments, one of the most perfect and complete of its kind.

Letters of inquiry should be addressed to

**DR. TRUMAN W. BROPHY, Dean,**
**126 State Street, Chicago, Ill.**

# Pennsylvania College of Dental Surgery.

**Eleventh Street, below Spruce, corner of Clinton St.**

## FORTY-THIRD ANNUAL SESSION, 1898-99.

### FACULTY AND AUXILIARY INSTRUCTORS.

J. EWING MEARS, A.M., M.D., Professor of Anatomy and Surgery.
C. N. PEIRCE, D.D.S., Professor of Principles and Practice of Operative Dentistry.
WILBUR F. LITCH, M.D., D.D.S., Professor of Materia Medica, Therapeutics, and Principles of Prosthetic Dentistry.
HENRY LEFFMAN, M.D., D.D.S., Professor of Chemistry and Metallurgy.
ALBERT P. BRUBAKER, M.D., D.D.S., Professor of Physiology, General Pathology, and Bacteriology.
I. NORMAN BROOMELL, D.D.S., Professor of Dental Anatomy, Dental Histology, and Prosthetic Technics.
GEO. W. WARREN, A.M., D.D.S., Professor of Clinical Dentistry and Oral Pathology.

PERCIVAL E. LODER, M.D., D.D.S., Demonstrator of Anatomy.
EDWARD F. WAYNE, D.D.S., Demonstrator of Chemistry.
J. HOWARD GASKILL, D.D.S., Demonstrator of Operative Dentistry.
FREDERICK R. BRUNET, D.D.S., Demonstrator of Prosthetic Dentistry.
RUPERT BEALE, D.D.S., Demonstrator of Prosthetic Dentistry.
WILLIAM B. WARREN, D.D.S., Assistant Instructor in Crown- and Bridge-Work.
W. K. THORPE, D.D.S., Demonstrator of Operative Dentistry.
WILLIAM T. HERBST, D.D.S., Demonstrator of Prosthetic Dentistry.
CHARLES S. HEARN, M.D., Instructor in Histology and Microscopy.
E. ROLAND HEARN, D.D.S., Demonstrator of Operative Dentistry.
F. A. CONEY, D.D.S., Instructor in Carving Block-Teeth, Full Porcelain Dentures, Continuous Gum-Work, etc.
F. P. RUTHERFORD, PH.G., D.D.S., Instructor in Bacteriology, Pharmacology, etc.
OSCAR BRITTON, D.D.S., Demonstrator of Operative Dentistry.
OSCAR T. WAYNE, D.D.S., Demonstrator of Operative Dentistry.
JOHN A. MORAN, D.D.S., Demonstrator of Operative Dentistry.
A. GRANT LODER, M.D., Assistant Demonstrator of Anatomy.
META T. HALEY, D.D.S., Demonstrator of Operative Dentistry.
E. A. KRETSCHMAN, Instructor in Modeling.

### CLINICAL INSTRUCTORS.

Dr. J. N. FARRAR,
Dr. W. G. A. BONWILL,
Dr. A. L. NORTHROP,
Dr. C. PALMER,
Dr. R. H. SHOEMAKER,
Dr. CHAS. F. BONSALL,
Dr. C. S. STOCKTON,
Dr. T. F. CHUPEIN,
Dr. W. H. TRUEMAN,
Dr. C. E. FRANCIS,
Dr. A. H. BROCKWAY,
Dr. A. B. ABELL,
Dr. R. HOLLENBACK,
Dr. I. N. YOUNG,
Dr. MARY H. STILWELL,
Dr. G. S. JAMESON,
Dr. LIBBEY,
Dr. REGISTER,

This College has accepted the requirements of the National Association of Dental Faculties with regard to admission and graduation of students. (See announcement for 1898-99, which can be procured from the Dean.)

### THE SPRING AND FALL SESSIONS.

THE SPRING COURSE commences on the second Monday in April and continues until June 20. Fee, $50, which will be credited upon the fee for the regular session.

THE FALL COURSE will commence September 6, and continue until the 1st of October, and will be free to those who matriculate for the regular session.

Attendance upon the Spring and Fall courses will be deemed equivalent to the term of pupilage under a private preceptor.

### THE REGULAR SESSION

Will commence on October 1, 1898, and continue until April 1. Twenty lectures will be delivered each week on the various branches taught.

### CLINICAL PRACTICE.

Lecture hours excepted, general clinical practice is available for the student continuously through the day. Competent instructors are always present.

### GRADUATION IN MEDICINE.

By an arrangement with Jefferson Medical College, such students as may desire to do so can, if found qualified, obtain the two degrees, in Dentistry and Medicine, in five years. Students desiring to graduate in medicine are required to notify the Dean of their intention at the beginning of their second course.

### FEES.

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|---|---|
| Matriculation (paid but once) | $5.00 |
| For each Year (Demonstrators' Ticket included) | 100.00 |
| Dissecting Fee | 10.00 |
| Diploma Fee | 30.00 |

Board can be obtained at from $4.00 to $6.00 per week.

The instruments and tools required can be procured for from $35.00 to $45.00. This sum does not include the price of dental engine.

For further information, address

**C. N. PEIRCE, D.D.S., Dean, 1415 Walnut St., Philadelphia.**